Development and Evaluation of Humor-Based Online Positive Psychology Interventions in Placebo-Controlled Designs

Thesis (cumulative thesis)

presented to the Faculty of Arts and Social Sciences

of the University of Zurich

for the degree of Doctor of Philosophy

By Sara Wellenzohn

Accepted in the fall semester 2015

on the recommendation of the doctoral committee:

Prof. Dr. Willibald Ruch (main advisor)

Prof. Dr. Carmelo Vázquez

PD Dr. René T. Proyer

Zurich, 2017

Abstracts

Die Dissertation ist im Forschungsgebiet der Positiven Psychologie im Bereich zwischen online positiv-psychologischen Interventionen (PPIs) und der Humorforschung angesiedelt. In drei Teilen werden die Fragen *ob*, *für wen* und *wie* humorbasierte PPIs wirken, erforscht.

Die Wirksamkeit einer etablierten und vier neu entwickelter humorbasierten PPIs wird hinsichtlich der Steigerung des subjektiven Wohlbefindens und der Verringerung depressiver Symptome in einer placebokontrollierten Onlinestudie (N = 984) überprüft. Persönlichkeitseigenschaften und Sinn für Humor werden im zweiten Teil als mögliche Moderatoren von humorbasierten PPIs (N = 104; N = 632) untersucht. Durch die Variation des Zeitfokus von humorbasierten PPIs werden im dritten Teil mögliche Wirkmechanismen (Aufmerksamkeitsverschiebung und Wiedererleben positiver Emotionen) in einem experimentellen Setting (N = 695) erforscht.

Die Ergebnisse der Dissertation zeigen, dass humorbasierte PPIs zur Steigerung des Wohlbefindens und Reduktion depressiver Symptome führen, dass sie unabhängig vom Ausgangslevel im Sinn für Humor und der meisten Persönlichkeitseigenschaften funktionieren und dass die Aufmerksamkeitsverschiebung und das Wiedererleben positiver Emotionen erklären könnten, wie die Interventionen wirken. Die Dissertation liefert einen wertvollen Beitrag zum Feld der positiv-psychologischen Interventionen und könnte zukünftige Forschung anregen und zur vermehrten Anwendung von humorbasierten PPIs in der Praxis beitragen.

This thesis is embedded in the area of positive psychology at the interplay between online positive psychology interventions (PPIs) and humor research and investigates *whether*, *for whom,* and *how* humor-based PPIs work. Firstly, the effectiveness of one established and four newly developed humor-based PPIs in enhancing happiness and lowering depressive symptoms for up to six-months is tested in a placebo-controlled online study (N = 984). Secondly, possible moderators (i.e., basic personality traits and sense of humor) in humor-based PPIs are examined in two placebo-controlled studies (N = 104; N = 632). Thirdly, two possible working mechanisms (i.e., attentional shift to the positive and savoring of positive emotions) are investigated by varying the time-focus of a humor-based PPI in an experimental placebo-controlled study (N = 695).

Overall, the findings of the present thesis show that humor-based PPIs are effective means for increasing happiness and ameliorating depressive symptoms, that their effectiveness does not dependent on the initial levels in sense of humor and most basic personality traits, and that attentional shift and savoring of positive emotions could be important mediators in such interventions. The studies make a valuable contribution to the field of positive psychology interventions and should encourage further research in and practice of humor-based PPIs.

Acknowledgements

Ich möchte mich bei allen bedanken, die mir das Verfassen dieser Dissertation ermöglicht haben. In erster Linie bei Prof. Dr. Willibald Ruch und PD Dr. René Proyer für die Betreuung meiner Dissertation und Prof. Dr. Carmelo Vázquez für seine wertvollen Rückmeldungen zu den Studien.

Prof. Ruch bin ich besonders dankbar, dass ich die Art und Weise lernen durfte, wie man wissenschaftlich über die Dinge nachdenken und mit einem geschärften Blick psychologische Themen analysieren kann. Darüber hinaus möchte ich mich für seine Mischung aus Forderung und Förderung bedanken, welche mich angespornt hat mich Herausforderungen zu stellen und daran zu wachsen. PD Dr. René Proyer möchte ich danken, dass er mich immer wieder mit seiner Begeisterung für die Forschung angesteckt hat. Wenn ich an einem Punkt nicht weiter kam, wusste ich, dass nach einer Besprechung mit ihm, das Ganze wieder völlig anders aussehen wird: Er sah stets einen Weg, um Hindernisse zu überwinden und unterstützte mich, meine Ziele zu erreichen. Auch die Arbeit im SNF-Projekt zu Positiven Interventionen war durch die Stimmung im Team – eine gute Mischung aus Tatendrang und Humor – äusserst angenehm und produktiv. In diesem Zusammenhang möchte ich mich insbesondere bei Dr. Fabian Gander für die Zusammenarbeit im Projekt bedanken. Ich hätte es nicht besser treffen können, als mit jemandem so kompetenten, zuverlässigen und hilfsbereiten die Arbeiten voranbringen zu dürfen. Er hat mir gezeigt, dass sich Gelassenheit und Analytisches Denken ideal kombinieren lassen, um Pläne effizient umzusetzen.

Darüber hinaus bin ich all meinen Kolleginnen und -kollegen am Lehrstuhl Persönlichkeitspsychologie und Diagnostik dankbar für den Austausch und die gegenseitige fachliche und persönliche Unterstützung während der Zeit der Dissertation. Auch möchte ich mich bei allen bedanken, die meine Arbeiten korrekturgelesen haben, insbesondere bei der Familie Delannay und bei Appletree.

Insgesamt war das Doktoratsstudium eine sehr schöne, lehrreiche und auch sehr intensive Zeit. Deshalb möchte ich mich ganz herzlich bei meiner Familie und meinen Freunden bedanken, dass sie immer für mich da waren, mein Vorhaben unterstützt und stets für einen super Ausgleich in der Freizeit gesorgt haben.

Summary

This thesis is embedded in the area of positive psychology at the interplay between positive psychology interventions and humor research. Online positive psychology interventions (PPIs) that are based on a framework of humor are investigated in placebo-controlled studies. The literature on humor interventions is very scarce and there is even less research on interventions in non-clinical settings that can be self-administered (i.e., without a personal instruction). This thesis aims at narrowing this gap, by investigating several pending research questions about humor-based PPIs: In short, the effectiveness, moderators and proposed working mechanisms of humor-based PPIs are examined in several empirical online intervention studies.

This thesis consists of three parts: In the first part the effectiveness of self-administered humor-based PPIs is tested in an online setting. So far, only one humor-based PPI has been conducted (i.e., the *three funny things intervention* by Gander et al., 2013), that can be administered over the Internet. New interventions are designed based on well-established PPIs combined with the knowledge of humor research. This led to the development of four new humor-based PPIs – all using different intervention strategies and covering different aspects of humor. In addition to these new interventions, findings for the three funny things intervention are replicated. These five humor-based PPIs (between 101 and 109 complete cases per intervention condition) were tested in a placebo-controlled (i.e., early memories, $n = 105$) online intervention study with happiness and depressive symptoms being assessed pre-test, after the intervention week and at three follow-up time points (i.e., one, three, and six months). Findings showed that two of the newly developed interventions (i.e., *counting funny things*, and *applying humor*) were effective in enhancing happiness for up to six months. Additionally, we were able to replicate the effects of the *three funny things*-intervention on happiness and depressive symptoms (effects on happiness up to six months,

however, on depressive symptoms just at the post-test). Also the newly developed interventions were effective regarding depressive symptoms directly after the intervention. At follow-ups effects were found for the *collecting funny things*- and the *applying humor-intervention*. Additionally, several indicators of a person × intervention-fit were investigated. *Early changes* in happiness and depressive symptoms, and *preference* (i.e., how much a person liked the intervention and subjectively benefited from it) were found as the best indicators for long-term changes in happiness and depressive symptoms. These findings support the notion that humor-based PPIs are effective, but that further investigation is needed to shed light on the role of depression, but also on *why* some interventions work better than the others. Therefore, possible moderators are investigated in Part II with possible working mechanisms being examined in Part III. The hypotheses in part III were derived from the study in Part I.

In the second part, possible moderators of humor-based PPIs are examined. From research in PPIs, it is known that basic personality dimensions do play a role. Thus, in Study 1 of Part II extraversion, neuroticism, and psychoticism are investigated. Higher levels in extraversion were found to be associated with a greater effectiveness of the *three funny things intervention* compared to a placebo control group ($N = 104$). In Study 2 of Part II, a trait is investigated that is more closely related to the content of the interventions; sense of humor (as defined by McGhee, 2010b). No moderating effects of the sense of humor (or its facets) on the humor-based PPIs ($N = 632$) were found, but early changes in sense of humor showed to predict long-term changes in happiness and depressive symptoms. Thus, no specific levels of sense of humor seem to be needed to make humor-based PPIs work, but sense of humor seems to be an important mechanism of humor-based PPIs. Future research is needed to further examine the role of sense of humor as a working mechanism and, moreover, to test whether other humor-based PPIs

are also more suitable for extraverted persons, or whether the moderating effect was due to the intervention strategy, and not to the content of the intervention.

In the third part, the time focus of PPIs was varied to test its influence on two possible working mechanisms (i.e., attentional shift to the positive and savoring of positive emotions). It is expected that a time focus on the presence triggers both proposed mechanisms, a time focus on the past emphasizes the savoring mechanism, while a time focus on the future triggers mostly the attentional shift mechanism. For this experimental placebo-controlled intervention study, a future (n = 189) and a past variant (n = 160) of the three funny things intervention (n = 180; its original instruction has a present-focus) were constructed. Results showed that all three variants were effective in enhancing happiness and ameliorating depressive symptoms from pre- to post-test compared to the placebo condition (i.e., early memories, n = 166). Additionally, all three interventions were more effective in shifting the attention to positive things, compared to the placebo condition. As expected, the original intervention boosted both mechanisms. As hypothesized, the future variant triggered the attentional shift mechanism more strongly than the past variant, whereas the past variant triggered the savoring positive emotions mechanism more strongly than the future variant. However, this was not found for the absolute levels in these working mechanisms. Thus, further research is needed to further distinguish between the working mechanisms and measure the mechanisms with more precise and objective instruments (e.g., eye tracking methods). In conclusion, initial support was found that the time focus triggers different mechanisms. However, little is known about the working mechanisms of PPIs in general and very little research has been conducted on testing mechanisms in experimental settings, despite the great value knowing *how* interventions work could have for research and its application. This study aims to address these research gaps.

Overall, the findings of the present thesis showed the potential of humor-based PPIs and encourage further research. The studies are all based on rather large sample sizes and stand out in terms of the number of follow-ups included. Thus, they make a valuable contribution to the field of positive psychology interventions, by giving initial answers to the questions *whether*, *for whom,* and *how* humor-based PPIs work. Moreover, the findings might also strengthen the position of humor-based interventions in positive psychology and humor research. The results from the studies testing moderating effects and the study on potential working mechanisms can be used to construct more effective PPIs and help tailor interventions to its participants. This might increase the application of humor-based PPIs in the future.

Table of Contents

List of Tables

General Introduction

Part I

Part II

Part III

List of Figures

General Introduction

Part I

Part II

Part III

General Introduction

A Brief Introduction to Positive Psychology

When Martin E. P. Seligman was president of the American Psychological Association in 2000, he emphasized the phenomena that in the past decades, psychology strongly focused on investigating psychological illnesses and how to treat them (Seligman & Csikszentmihalyi, 2000). Seligman and Csikszentmihalyi (2000) report that before World War II, psychology was divided into the three following areas: "curing mental illnesses, making the lives of all people more productive and fulfilling, and identifying and nurturing high talent" (Seligman & Csikszentmihalyi, 2000; p. 6). After World War II, there was a great need for therapists to treat not just physically but also psychologically harmed veterans, leading to a strong shift towards clinical research and therapy. Ever since, most efforts in psychology have been in the clinical field, which has led to great progress in treating many psychological illnesses. However as a result, the other two pillars of psychology mentioned earlier were neglected for quite some time. Thus, in his inauguration speech as the new president of the American Psychological Association (Seligman, 1999), Seligman emphasized that psychology should broaden its focus again by, for example, investigating what makes life worth living.

Myers (2000) explored the terms used in psychological research (using *Psychological Abstracts*) from 1887 to 2000. There were 8,072 articles on anger, 57,800 on anxiety, 70,856 on depression, with only 851 of the abstracts including joy, 2,958 happiness, and 5,701 life satisfaction. His literature review leads to the conclusion that there was a clear bias to focus (with a 14-to-1 ratio) on negative topics. He refers to this observation as the "negativity bias" in psychology. Of course, research on anxiety and related constructs is greatly needed and much progress has been made in these fields that allow treating people with psychological problems and alleviating their symptoms and suffering. However, other areas might have been

eclipsed in the process. To boost research in these comparatively neglected areas, Seligman founded the field of Positive Psychology in 1999.

Seligman (1999) proposed: "Our mission is to utilize quality scientific research and scholarship to reorient our science and practice toward human strength. In this way, we can learn to identify and understand the traits and underpinnings of preventive psychological health and, most importantly, learn how to foster such traits in young people" (Seligman, 1999; p. 561). Moreover, "Positive psychology should not only have as a useful side effect the prevention of serious mental illness, but it also holds the potential to create, as a direct effect, an understanding and a scientifically informed practice of the pursuit of the best things in life and of family and civic virtue" (Seligman, 1999; p. 562). In a nutshell, positive psychology should become a discipline in psychology that subsumes empirical research and scientifically based psychological practice in topics related to well-being and optimal functioning. Positive psychology is often described as being based on three pillars: positive traits, positive organizations, and positive institutions.

At this point, it needs to be strongly emphasized, that the idea of positive psychology is not a new invention that has only been around since 2000. There have been a number of psychologists with similar aims and research topics, for example, the humanistic psychology movement as a cross-current to the pessimistic psychoanalysis at the beginning of the 20th century. Some of its famous founders were Maslow (1954), who generally followed a positive approach to psychology and developed a positive theory of motivation, which includes, amongst other things, self-actualization as one of our core needs, or Rogers (1961), who established the person-centered therapeutic approach with the aim of developing healthier and more creative functioning.

Since the founding of positive psychology as a field in psychology, there have been a lot of research efforts by scientists all over the world (e.g., reflected by the international conferences of positive psychology as well as the installation of international [e.g.,

International Positive Psychology Association, IPPA] and national societies, e.g., SWIPPA, *Swiss Positive Psychology Association*) and many practical applications as well as more research-oriented contributions have been put forward. For example, Peterson and Seligman (2004) developed a classification of positively valued traits, the Values in Action (VIA) classification. Each trait needs to fulfill ten criteria to be included as a character strength in the classification (e.g., the opposite of the strength cannot also be a strength, there are institutions fostering the strength, or that prodigies exist that show the strength from very early in their life on). To come up with possible candidates for the VIA classification, Peterson and Seligman (2004) searched through various sources, from philosophical to religious, to comic literature, and superheroes in movies, and came up with 24 character strengths. They assigned these character strengths to six virtues (i.e., courage, justice, humanity, temperance, wisdom, and transcendence) on theoretical grounds. Recently, using expert judgments, Ruch and Proyer (2015) found generally a good correspondence for the assignment of the strengths to the virtues.

Peterson, Park, and Seligman (2005a) also created a self-report instrument for the assessment of character strengths, the VIA-IS (the *Values in Action Inventory of Strengths*; in the German Version by Ruch et al., 2010). The VIA-IS has been used in numerous studies. For instance, character strengths were not only found to contribute to life satisfaction (Brdar & Kashdan, 2010; Buschor, Proyer, & Ruch, 2013; Martínez-Martí & Ruch, 2014; Park, Peterson, Seligman, 2004; Peterson, Ruch, Beermann, Park, & Seligman, 2007), but also to better (self-rated) physical fitness (Proyer, Gander, Wellenzohn, & Ruch, 2013), and faster recovery after physical illness (Peterson, Park, & Seligman, 2006). Peterson and Seligman (2004) stated that each person has three to seven signature strengths. They have stated several criteria, which determinate a signature strength, such as that one is intrinsically motivated to use the strength and one is feeling excitement while using the strength. Further, character strengths seem to play an important role in the workplace, especially the signature strengths.

For example, Harzer and Ruch (2012) found that if a person can apply at least four of their signature strengths (i.e., a person's top personal strengths) in the workplace, they are more likely to see their job as a calling (compared to just a job to earn money or a job to get to the next level in their career) and report more positive experiences at work. Moreover, character strengths were found to contribute to healthier work-related behaviors (Gander, Proyer, Ruch, & Wyss, 2012).

Character strengths have also been investigated in the context of positive psychology interventions and were found to be effective methods to enhance well-being (e.g., Proyer, Ruch, & Buschor, 2013; Seligman, Steen, Park, & Peterson, 2005). There seems to be a need for such interventions. Keyes (2002) found that in a sample of 3,023 adults between 25 and 75 years of age, 14.1 percent fit the criteria of a major depressive episode, while 17.2 percent of the people were flourishing, which he defines as the presence of mental health (i.e., consisting of emotional, psychological, and social well-being).Many psychological and psychopharmacological therapies have been established to treat the first group and to lower their symptoms. However, psychology should also take care of the remaining approximately 70 % of people, who are somewhere in the middle, not suffering from a psychological illness, but also not flourishing. Some of them might want to know what they can do to become happier. That there is a need for interventions targeting these people can easily be observed by the huge amount of self-help books on how to be happy and live a more fulfilling life.

Positive Psychology Interventions

As described above, the main aim of positive psychology is to study what contributes to people's well-being. An additional aim is to find ways to promote well-being. This kind of research can be seen as the applied side of positive psychology, in the sense that one tries to apply the theoretical knowledge to establish interventions to increase people's well-being. One approach to boosting a persons' well-being are so-called *positive psychology interventions* (PPIs). They are defined as "treatment methods or intentional activities that aim

to cultivate positive feelings, behaviors, or cognitions", but they do not include "programs, interventions, or treatments aimed at fixing, remedying, or healing something that is pathological or deficient—as opposed to building strengths" (Sin & Lyubomirsky, 2009, p. 468). This is a rather broad definition so that many different kinds of interventions can be subsumed. Fordyce (1977/1983) was one of the pioneers in this field of investigating interventions that are now known as PPIs (Positive Psychology Interventions). He developed and tested a program, called the "14 Fundamentals of Happiness", which aimed at enhancing happiness. The program consists of 14 tasks based on characteristics that are typical for happy individuals and also applicable to individuals in the middle range of happiness. Tasks were, for example, to keep busy and be more active, to spend more time socializing, or to be productive at meaningful work. Meanwhile, many other programs and also brief activities have been established.

Sin and Lyubomirsky (2009) published the first meta-analysis on positive psychology interventions. They included 51 intervention-studies, which showed a mean-effectiveness of $r = .29$ for well-being and $r = .31$ for depressive symptoms. Although all interventions aim at enhancing well-being, they differ in their content (e.g., positive traits like gratitude, or kindness, or strengths in general, but also on strengthening goals or mindfulness). Moreover, the structure and implementation methods also differ. For example, some interventions are structured in several steps while others are very brief, some are applied in individual settings with a therapist, some are self-administered in a web-based intervention, whereas others are applied in group settings.

Recently, another meta-analysis on the topic was published (Bolier, Haverman, Westerhof, Riper, Smit, & Bohlmeijer, 2013). The main difference to the former meta-analysis is, that they included intervention studies (most recent 2009 – 2012) that met stricter criteria. These were: a) the intervention should have been explicitly developed in line with the theoretical tradition of positive psychology, b) randomization of the study subjects and

presence of a comparison condition, c) publication in a peer-reviewed journal, d) including well-being or depression as outcome measures, and e) reporting sufficient statistics to enable computing standardized effect sizes. They found 39 intervention studies fulfilling the criteria with a standardized mean difference of 0.34 for subjective well-being, 0.20 for psychological well-being and 0.23 for depression. Overall, they also conclude that PPIs are effective in enhancing subjective well-being and ameliorating depressive symptoms. They also discuss that mostly small effects were found and that more high-quality studies are needed to strengthen the evidence that PPIs are effective—also from a practical perspective. As mentioned, the literature on humor will be reviewed later (section *A Brief Introduction to Humor*), but it should already be mentioned that none of the 51 studies reported in Sin and Lyubomirsky (2009), and 1 out of the 39 studies reported in Bolier et al. (2013) were based on humor. Thus, more research in this field also seems highly warranted to narrow this gap in the literature on positive psychology interventions.

Besides giving an overview on the effectiveness of PPIs, the meta-analyses also searched for possible moderators of their effectiveness, i.e. trying to find under which circumstances the interventions work best. Lyubomirsky and Layous (2013) came up with a theoretical model on what variables might influence the effectiveness of PPIs (see Figure 1).

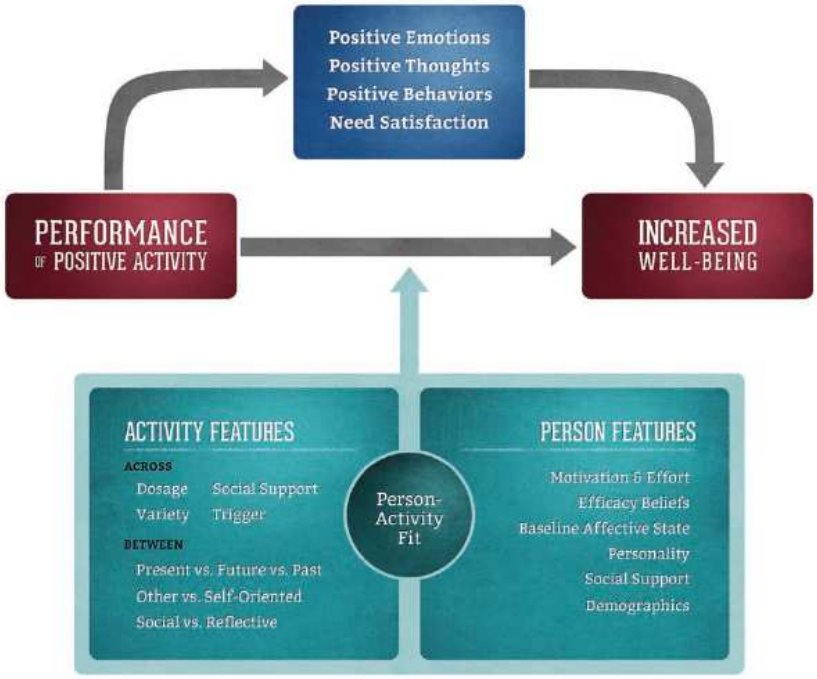


Figure 1. The positive-activity model by Lyubomirsky, S., & Layous, K. (2013). How do simple positive activities increase well-being? *Current Directions in Psychological Science*, *22*, p. 58. Copyright 2013 by the Association for Psychological Science.

As shown in *Figure 1*, Lyubomirsky and Layous (2013) clustered the variables into mediators (i.e., positive emotions, thoughts, behaviors, and need satisfaction) and moderators (i.e., person-activity fit) that could, or were already found to enable or influence a PPI (here called positive activity) in its effectiveness in increasing well-being. They further split variables of the person × activity-fit into features of the activity and features of the person. The following sections will elaborate on the various moderators and mediators.

Sin and Lyubomirsky (2009) found, for example, that the *intervention format* (i.e., how the intervention was administered) had a moderating effect, with individual therapy being most effective, followed by group therapy, and self-administered PPIs. The latter refer mainly to web-based positive psychology interventions such as the ones reported in Seligman, Steen, Park, and Peterson (2005). They were pioneering in the field of online PPIs with their study on the effectiveness of several PPIs in an online-setting and using a placebo-controlled design with long-term follow-ups, the studies in present thesis are also oriented on this

design. Of course, the question regarding the advantages and disadvantages of the different formats arises. Mitchell, Vella-Brodrick, and Klein (2010) concluded in a meta-analysis of PPIs administered over the Internet, that they could be administered effectively. Up to the time of Mitchell et al.'s analysis, there were just five online PPI studies available, but the advantages of promoting well-being over the Internet are very promising. Accessibility (i.e., interested people can access the activities wherever and whenever they want) and scalability (i.e., many participants can access the interventions at the same time) are two of the main advantages of online PPIs. Mitchell and colleagues state that there is the need for more evidence regarding the effectiveness of online interventions. It should be mentioned that since 2010 about 11 online positive psychology interventions were published, supporting the notion that they are effective in increasing well-being and ameliorating depression. The present thesis will contribute to this line of research by using the Internet as a tool to administer and also evaluate interventions.

Further moderators have been investigated, for example the *person* × *intervention-fit*, reflecting on the research question for whom the interventions are most suitable. For example, Schueller (2012) investigated basic personality traits in the context of a gratitude-, a savoring-, and a strength-based-intervention, and found extraverted participants to benefit more from the first two, but introverts benefiting more from the latter. This was contrary to the findings by Senf and Liau (2013) who found extraverts benefitting more from a gratitude- and a strengths-intervention. Overall, several studies suggest that individual difference variables moderate the effectiveness of PPIs. Besides investigating traits of the person, the person × intervention-fit can also be tested by assessing indicators for a good fit between the person and the intervention (Proyer, Wellenzohn, Gander, & Ruch, 2015). Based on the importance of moderators in PPIs, they will also be investigated in the present thesis in Part I. As in the study by Proyer, Wellenzohn, and colleagues (2015) indicators of a person × intervention-fit will also be assessed. Moderators for the effectiveness of humor-based

positive psychology interventions will be assessed in Part II by testing basic personality traits and sense of humor (in the sense of McGhee, 2010) as moderators. Proyer, Gander, Wellenzohn, and Ruch (2015c) compared a signature strengths-intervention with a lesser strengths-intervention. They found both interventions to be effective, which indicates that the baseline level in strengths of character does not seem to play a role, when a positive trait is trained. It will also be tested whether this assumption holds for the baseline level in sense of humor in a humor-based PPI (in Part II).

Besides moderators of PPIs another emerging field, which is still in its infancy, is the investigation of working mechanisms, or mediators (see Figure 1). Many authors of positive psychology intervention studies hypothesize that the reason the interventions are effective is due to *positive emotions*. Often authors refer to the broaden-and-build-theory by Fredrickson (1998). The idea is that positive emotions trigger an upward-spiral of further positive emotions and, thereby enable the broadening component of positive emotions (e.g., contributing to build resources). Very recently, Quoidbach, Mikolajczak, and Gross (2015) also focused on positive emotions in the context of PPIs, but designed a fine-grained process model, using emotion regulation as a framework. They included the time frame of when the emotion regulation strategy is applied (i.e., before, during, or after the event) to structure the model. Quoidbach and his colleagues (2015) suggest that every proposed working mechanism (i.e., emotion regulation strategy) can be used in all three time frames, but that its effectiveness will vary depending on which strategy is used in which time frame. Similarly, in Part III of the present thesis, time was also considered an important variable that can determine which mechanisms are triggered depending on the time the intervention uses. More details on this are given in the section on the research questions (section: *Research Questions and Aims of the Present Thesis*).

Overall, the present thesis can be seen as a fusion of research in positive psychology interventions and humor. In the following sections, research on humor will be introduced to give a brief overview.

A Brief Introduction to Humor

Humor research has a long tradition and is an important topic in many different disciplines from linguistics to psychology and political science (Raskin, 2008). Of course, only a brief overview can be given here, while full accounts are given in the Encyclopedia of Humor Studies edited by Attardo (2014), and in the books by Chapman and Foot (1977), Martin (2007), McGhee and Goldstein (1983ab), or Raskin (2008). In the field of aesthetics, humor is one element of the comic (e.g., wit, fun, sarcasm would be further sub-categories of comic), and the comic – the ability to make one laugh or to amuse – in turn is one of the different aesthetic qualities (Ruch, 2007). In this narrow understanding of *humor*, the term humor is only used, when talking of *benevolent* ways to make someone laugh. In this field, *sense* of humor is also of a benevolent nature and can be seen as an attitude towards life (Ruch, 2007). From an Anglo-American research perspective, on the other hand, humor can be seen as an umbrella-term for everything that is funny, thus, including jokes, witty comments, cartoons, satire, etc. (Ruch, 2007). In the present thesis, the broader Anglo-American research perspective on humor is used to transform the original interventions into humor-based interventions. As the humor-based interventions, developed in this thesis, will be applied in self-administered settings and in a one-size fits all manner, the term humor is described as broad as possible in the interventions instructions. This should allow the participants to choose the kind of humor they appreciate most to conduct their intervention tasks.

Back in the history of psychology, Freud differentiated humor from jokes. He assumed that *jokes* serve as outlets for taboos and suppressed emotions (Freud, 1905/2012), in the sense of a "boiler-metaphor". Thus, he explained, that "the omission of the inhibition- or the

suppression-effort is the secret of the lust-effect in tendentious jokes" (Freud, 1905/2012, p. 133). This theory in the framework of psychoanalysis aims to explain, for example, why many jokes are based on sex-related topics, or other topics that are not appropriate to talk about in public or only in more private circles of friends. *Humor*, on the other hand, has more dignity and is not just used for the lust-effect, but, he writes, "it is rather an attitude, which enables oneself to refuse from suffering" (Freud, 1927/2012, p. 255; see also Kline, 1977, or Matte, 2001). Other renowned psychologists such as Eysenck (1942) have also worked on humor. However, the topic has never been the focus of mainstream research.

Going even further back in history and to a possible reaction to humor, Platon and Aristotle wrote about laughter and its possible origins and facilitators (Beermann & Ruch, 2009). They rather saw the dark side of humor, seeing it as an immoral event. Humor is a topic that is also being discussed in more recent philosophical literature (for an overview see Morreall, 2009) and some theories on why and when somebody finds something funny, are in an analogous manner – humor appearing in a rather bad light –, for example, in the disparagement theory by Zillmann (1983). On the other hand, the incongruity-resolution theory (for an overview see Suls, 1983) describes rather neutrally, why someone perceives something as funny. Moreover, it also gives an idea on how jokes are constructed. Nowadays humor once again has a more positive connotation; especially the term sense of humor is mostly seen as a positive characteristic to have and to describe others (Ruch, 2008).

Although different definitions and views exist and no agreement has been achieved, humor has played an important role in theories describing personality (Ruch, 2007). For example, Eysenck sees laughing a lot, telling jokes and funny stories, as core components of extraversion and also integrated items to assess extraversion that are related to humor into the EPQ (Eysenck & Eysenck, 1975). Luborsky and Cattell (1947; see also Cattell & Schuerger, 1978) have studied humor as a more objective indicator of basic personality traits. Studies

exist, in which authors have tried to localize humor in models describing basic personality traits (e.g., Hehl & Ruch, 1985).

Although there are different definitions of humor, there is, however, a common understanding that humor in psychology can be investigated from two different angles: The *appreciation* of humor and the *creation* of humor (Ruch, 2007). For the former, mostly self-report instruments are used to assess typical behavior or preferences and for the latter tests assessing maximal behavior are used (e.g., the "Cartoon Punch line Production Test" by Köhler & Ruch, 1996). Several conceptualizations of sense of humor consider both angles (the appreciation and the creation of humor), but with different fine-grained facets. Ruch and Köhler (2007) developed a temperamental approach to humor, which is represented by a state-trait model that is expected to be relevant for the behavioral and the experiential domain of humor. The model is based on three proposed dispositions of humor, namely, cheerfulness, seriousness, and bad mood (for an overview see Ruch & Hofmann, 2014).

Furthermore, McGhee's (2010b) theory of the sense of humor considers mainly the appreciation of humor. His model contains several dimensions. He states that a playful attitude and a positive mood are needed to be able to use a sense of humor. Therefore, besides the sense of humor, he also includes the attitude dimension from serious to playful and the mood dimension from negative to positive in his theory of humor. The sense of humor itself is based on six facets, namely, enjoyment of humor, laughter, verbal humor, humor in everyday life, laughing at yourself, and humor under stress. In this theory-driven approach, he sees the sense of humor as a form of play, the play with ideas.

Craik, Lampert and Nelson (1996) searched for the folk concept of sense of humor based in the framework of different styles of humor behaviors, thus, focusing more on the humor creation side. Using an act frequency approach, they found that the sense of humor is best represented by the humorous behaviors that are assigned to a *socially warm* humorous style and to a *competent* humorous style (i.e., the two dimensions: Socially warm versus cold

humorous style and competent versus inept humorous style). Furthermore, sense of humor was unrelated to the other three dimensions of humorous conduct (i.e., reflective versus boorish, earthy versus repressed, and benign versus mean-spirited humorous styles). These findings support the assumption that sense of humor is largely positively viewed by the general public. Based on this research, the *Humorous Behavior Q-sort Deck* (HBQD) was developed. This instrument has been used in a broad range of studies. For example, gelotophobia (i.e., the fear of being laughed at) was found to be related to a social cold and inept humor style and also to mean-spirited humor (Ruch, Beermann, & Proyer, 2009). Furthermore, individuals with Asperger's syndrome showed a more socially cold humor but were low on mean-spirited humor (Samson, Huber, & Ruch, 2013).

Beside the widely positively valued side of humor nowadays, there is also a dark side to humor more closely related to laughter, than to humor in general (depending on the definitions; see Ruch, 1996). Ruch and Proyer (2008) published the first empirical work on the fear of being laughed at, gelotophobia, in which gelotophobes were found to be introverts and rather high on psychoticism. This special side of humor might also play a role in humor-based PPIs, as there might be individuals that tend to deny this topic.

Besides the attempts to define humor, another aim is to investigate the role of humor in everyday life and its possible consequences. Martin, Puhlik-Doris, Larsen, Gray, and Weir (2003) focus on the influences of humor on health and well-being. They distinguish between four different humor-styles; self-enhancing, self-defeating, aggressive, and affiliative humor. Several positive relations to health and well-being were found for self-enhancing and affiliative humor and negative relations for self-defeating and aggressive humor. Currently, this model and its measurement are being criticized for mixing up different styles of humor with its consequences and therefore not contributing to a clearer picture of the relations between humor and well-being (Ruch & Heintz, 2013). Humor, however, seems to have potential to contribute to a person's well-being. McGhee (2010b) and Ruch, Rodden and

Proyer (2011) as well as Martin (2001) give an overview on the literature on the positive relations between humor and well-being. Humor as a character strength also seems to play a special role, as it was found to contribute to faster recovery from physical illnesses (Peterson, Park, & Seligman, 2006). This is also in line with Vaillant (2002), who identified humor as a mature defense mechanism. Generally, humor is among the character strengths most strongly related to life satisfaction (e.g., Park, Peterson, Seligman, 2004; Peterson, Ruch, Beermann, Park, & Seligman, 2007; Ruch, Harzer, Proyer, Park, & Peterson, 2010), which was one of the reasons why humor was trained in a program with selected strengths to boost well-being (Proyer, Ruch, & Buschor, 2013).

Moreover, humor was, for example, found to elicit amusement (Ruch, 2001). Thus, one hypothesized way *how* humor can contribute to well-being is by eliciting positive emotions and therefore boosting the broaden-and-build effect of positive emotions as stated by Fredrickson (1998). Summing up and leading to the next chapter, a lot of research has investigated the positive effects of humor on health and well-being, therefore its inclusion in positive psychology is almost self-evident.

Humor and Positive Psychology

Humor [playfulness] is one of the 24 character strengths in the VIA-classification by Peterson and Seligman (2004). Thus, it was stated that humor can be seen as a morally positively valued trait, which fulfills all ten criteria to be included as a so-called character strength (i.e., humor needs to be fulfilling, morally valued, not diminish others, have non-felicitous opposites, be trait-like and distinct from the other strengths, paragons and prodigies of humor need to exist, but also individuals who are low in humor, and finally, that there are institutions and rituals that foster humor; see Peterson & Seligman, 2004). Humor is assigned to the virtue of transcendence among gratitude, sense of beauty and excellence, spirituality and hope. Beermann and Ruch (2009b) examined which components of humor are covered by humor as a character strength and also how laypeople see humor in the light of virtues

(Beermann & Ruch, 2009a). They found the virtues humanity and wisdom to be most suitable to humor. In a similar vein, Müller and Ruch (2011) investigated the relations of humor as assessed by the VIA-IS, with the sense of humor defined by McGhee (2010b), and the humor behaviors in everyday life by Craik, Lampert and Nelson (1996). They found that humor as character strength is strongest related to the virtue of humanity and positively to all dimensions of the sense of humor scale by McGhee (2010b). However, apart from the dimension of socially warm humor and competent humor, there were no positive relations to everyday humorous behaviors. Müller and Ruch (2011) interpret their findings as evidence that humor is generally assessed as a positive construct in the VIA-IS, but that this is not reflected by all dimensions of everyday humorous behaviors, thus, humor in everyday language and use, does not always reflect humor as a character strength. Müller and Ruch (2011) see this variety regarding the valence of humor as an explanation, why humor is not that often considered as a topic in positive psychology thus far. In addition, Ruch and Proyer (2015), based on expert ratings (i.e., familiar with the topic of personality or virtues), found that humor was not prototypical for the virtue of transcendence, but rather for humanity.

Several correlational studies found humor as a character strength to be among those character strengths that show the strongest correlations with well-being (e.g., Buschor, Proyer, & Ruch, 2013; Park, Peterson, & Seligman, 2004; Proyer, Ruch, and Buschor, 2013; Proyer, Gander, Wellenzohn, & Ruch, 2013). Moreover, Proyer, Gander, Wellenzohn, and Ruch (2013), found character strengths to contribute to physical well-being. Humor showed a particularly high relation to the health-behavior "leading an active way of life". Positive relationships were also found to have a strong relation with a general estimation of one's health, however, humor was found to be unrelated to indicators of one's physical fitness. Furthermore, the strength of humor was found to contribute to a better recovery after a history of physical illness (Peterson, Park, & Seligman, 2006).

Beermann and Ruch (2009) give an overview, on how humor has developed over time and how its valence changed under different circumstances and in different cultures. Based on their review, humor and especially laughter were often seen as undesirable or a sign of losing one's temper (Beermann & Ruch, 2009). Nowadays, humor and especially sense of humor is seen as a desirable trait (Müller & Ruch, 2011). Studies on mating show that humor is among the most desired traits, even among adolescents (Chick, Yarnal, & Purrington, 2012; Proyer & Wagner, 2015; Weber & Ruch, 2009). Having a sense of humor is a highly desirable trait (e.g., Weber & Ruch, 2012). As an example, a study on desired personality characteristics has found humor to be among the most preferred personality traits (Anderson, 1968). Craik, Lampert, and Nelson (1996) also reported findings supporting the notion that humor is a desirable trait, however, only a number of specific humorous behaviors (e.g., warmth and skill, humorous reflection, innocuous wordplay).

More recently, and in the same line, Weber and Ruch (2012) asked adolescents about which strengths an ideal partner should have. After honesty, humor was the most preferred strength. This was found for both, males and females. Weber and Ruch (2012) argue that different aspects of humor are liked by men in women and by women in men. Women might like their partner to be able to produce humor, and men supposedly like their partner to appreciate their kind of humor. Because humor as a character strength is more commonly assessed by items related to liking making others laugh, or to use humor in relationships, the appreciation part (e.g., liking to be exposed to certain forms of humor) might be missing. This is also in line with Müller and Ruch's (2011) findings that humor assessed with the VIA-IS shows the strongest relationships to using socially warm humor.

Overall, there is a broad array of studies supporting the notion that humor leads to positive effects, thus, it is not surprising that programs were developed to train humor. In the next section, an overview is given on the efforts in this area.

Humor Interventions

In conclusion, humor, both producing and appreciating it, is a desired personality characteristic. Thus, several programs have been developed to enhance an individual's sense of humor, mostly with the aim to contribute to subjective well-being. Training one's sense of humor to, for example, get more skilled in using humor, is one thing. However, humor is often also used in interventions as a way to elicit positive emotions. In line with the saying that humor is the best medicine, humor interventions are most widely known in form of hospital clown interventions, for example, to distract patients from pain. There are many institutions, like the Red Noses, or the Theodora foundation, supporting this endeavor by training and sending clowns to hospitals, usually to children and older people (Auerbach, Hofmann, Platt, & Ruch, 2014; Costa Fernandes & Arriaga, 2010; Dionigi, Sangiorgi, Flangini, 2014). Low et al. (2013) evaluated such clowns in residents (N = 398) of nursing homes in Australia. They did not find any effects on the resident's depression, compared to a treatment as usual control group, but they found a reduction in the level of agitation after 13 and 16 weeks. Moreover, humor interventions are often also used as a therapeutic measure in clinical settings to lower psychological symptoms and mental illnesses (Ruch & McGhee, 2014). Ruch, Rodden, and Proyer (2011) provide an overview on humor in therapeutic settings. Hirsch, Junglas, Konradt, and Jonitz (2010), for example, tested a humor intervention with clinically depressed elderly patients and found effects on life satisfaction and resilience compared to a treatment as usual group. Moreover, for the subgroup with medium to severely depressed patients, they found further effects on cheerfulness, seriousness, and bad mood in the expected directions, indicating that the program was most effective in severely affected patients. In the same vein, Konradt, Hirsch, Jonitz, and Junglas (2013), found humor therapy to be effective in patients with a major depression compared to a treatment as usual group. Both groups showed positive developments, however, only the humor group showed enhanced life satisfaction and lowered state seriousness. Rudnick,

Kohn, Edwards, Podnar, Caird, & Martin (2013) found a stand up comedy training for mentally ill adults to marginally improve their self-esteem compared to the passive control group (i.e., watching funny movies).

Humor-Based Positive Psychology Interventions: Current Findings

Since humor is positively related to several indicators of well-being (e.g., Martin, 2007), and potent in inducing amusement (Ruch, 2001, 2009), which might be helpful in building resources for well-being (Fredrickson, 1998), it could serve as a suitable basis for positive psychology interventions (PPIs). However, literature and knowledge on humor-based PPIs is very scarce. Ruch and McGhee (2014) give an overview on what is known about humor interventions. They report that most of the intervention studies are targeted and tested with persons with mental illnesses. To get an overview on the existing literature on humor-based interventions, a literature search with the following inclusion criteria was conducted: (a) the intervention is (primarily) based on humor; (b) it utilizes a non-clinical sample; and (c) authors report pre and post-measures for either (facets of) well-being or humor. The *ISI Web of Science*, *GoogleScholar*, and *Scopus* databases were searched, using the keywords 'humor intervention', 'humor training', 'humor program', and 'humor, intervention, well-being' (including facets of well-being) and identified eight studies fulfilling the criteria (see Table 1).

Table 1

Humor-based Interventions in Non-clinical Samples.

Authors	Intervention	Control	Duration	Format	Sample sizes	Sample characteristics	Outcome measures	Time points
Crawford & Caltabiano (2011)	8 step humor-program by McGhee	social group (morning tea meetings); wait-list (no-intervention)	8 weeks (1h/w)	group-administered	IG1 = 21, PCC1 = 20, PCC2 = 14	community sample	emotional well-being assessed by: stress, optimisms, self-efficacy, positive and negative affect	post, 3m
Gander, Proyer, Ruch, & Wyss (2013)	Three funny things	early childhood memories	7 days (15min/d)	self-administered (online)	IG = 55, PCC = 63	community sample	happiness; depressive symptoms	post, 1m, 3m, 6m
Ganz & Jacobs (2014)	humor therapy workshop	program as usual	12 sessions (2-3h/session) over 5 months	group-administered	IG = 50, PCC = 42	convenience sample of community-dwelling older people attending senior centers	general physical and mental health (well-being; anxiety; depression; psychological distress)	post (6m)
Lowis (1997)	humor workshop	no	5 weeks (2h/w)	group-administered	IG = 22	community sample	coping humor; frequency of humor initiation; humor response scale	post
Nevo, Aharonson, & Klingman (1998)	Sense of humor improvement program (active production & appreciation); Only appreciation-part of the program	Control activity (discussing study skills and test anxiety); no-intervention control	7 weeks (3h/w)	group-administered	IG1 = 24, IG2 = 23, PCC1 = 22, PCC2 = 19	female teachers	sense of humor; humor production; attitude towards humor	post

Table 1 (continued)

Authors	Intervention	Control	Duration	Format	Sample sizes	Sample characteristics	Outcome measures	Time points
Proyer, Gander, Wellenzohn, & Ruch (2014)	Three funny things	early childhood memories	7 days (15min/d)	self-administered (online)	IG = 20, PCC = 34	community sample, 50 - 70 years	happiness; depressive symptoms	post, 1m, 3m, 6m
Rusch & Stolz (2009)	8 step humor-program by McGhee (1999); humor-program by McGhee without homework assignments; unstructured humor-training	waitlist control group	8 weeks (2h/w)	group-administered	IG1 = 41, IG2 = 19, IG3 = 12, PCC2 = 26	community sample	sense of humor; cheerfulness; seriousness; bad mood; satisfaction with life scale; peer-rated sense of humor; peer-rated cheerfulness, seriousness, and bad mood	post, 2m
Sassenrath (2001)	8 step humor-program by McGhee (1999); humor-program by McGhee without homework assignments	Control activity (discussion meetings on socially relevant topics); waitlist control group	8 weeks (2h/w)	group-administered	IG1 = 20, IG2 = 20, PCC1 = 20, PCC2 = 20	community sample	Coping humor scale; positive and negative mental state; sense of humor	

Note. IG = intervention group; PCC = placebo control condition; 1m = one month follow-up; 2m = two months follow-up; 3m = three months follow-up; 6m = six months follow-up.

Table 1 shows that six of the eight studies used a group setting, while the other two were conducted online (self-administered). Lowis (1997) conducted a humor workshop consisting of five sessions aimed at learning how to use humor as a coping mechanism for life stress for people who recently went through stressful situations. There was *no* control condition, but Lowis reports increases in the use of coping humor from pre to post-test. Nevo, Aharonson, and Klingman (1998) conducted a 14-sessions program with teachers, aimed at improving five different components of "sense of humor" (control condition: social activity group and a no-intervention control group). Increases in peer-reported appreciation and production of humor and self-reported "attitude toward the personal sense of humor" (i.e., the evaluation of having a sense of humor) were found. Ganz and Jacobs (2014) conducted a "humor therapy" workshop with elderly people without cognitive impairment attending senior centers. In comparison to a waitlist control group, participants in the humor group demonstrated improved well-being and lowered anxiety, psychological distress, and depression (no effects on physical health).

McGhee developed a program to improve one's sense of humor, to be used in a group setting: "*The 7 Humor Habits Program*" (see McGhee, 2010a). The habits are structured with increasing difficulty (from "surround yourself with humor" to "find your humor in the midst of stress"). Crawford and Caltabiano (2011) administered the program over eight weeks and found increases in self-efficacy, positive affect, optimism and perceptions of control, as well as decreases in self-rated depression, anxiety and stress levels in adults compared to control groups (social activity and no-intervention). These improvements lasted for up to three months after the training. Moreover, McGhees's humor program has also been tested in two unpublished master-theses (Sassenrath, 2001; Rusch and Stolz, 2009). Sassenrath (2001) reports the strongest effects for McGhee's original humor program on enhancing the sense of humor, coping humor and the dispositions to humor. Rusch and Stolz (2009) found McGhee's original program to be effective in enhancing self-reported sense of humor and life

satisfaction, and ameliorating seriousness and bad mood compared to the waitlist group. These findings were also confirmed by similar changes in peer-reported sense of humor, bad mood, and cheerfulness.

Gander and colleagues (2013) were the first to test humor interventions in a self-administered, placebo-controlled online setting using a variant of the *three good things* intervention; namely, the *three funny things* intervention (writing down three *funny* things that happened during the day, every evening on seven consecutive days). They found increases in happiness at the one-month and three-months follow-up and an amelioration of depression at every follow-up time point (up to six months) in comparison to the placebo control condition writing about early memories. In a recent study, Proyer, Gander, Wellenzohn, and Ruch (2014) showed that similar findings were obtained in a subsample of the study by Gander et al. (2013) when analyzing only people aged 50 to 79 for depressive symptoms, although they only found only effects for happiness at the six-months follow-up.

Overall, the literature on humor-based PPIs is scarce, but the reported findings are promising. Therefore, the idea for the present thesis evolved, to merge what is known from humor research and what is known from positive psychology interventions. Thus, the starting point of the thesis is to build on what Gander et al. (2013) initiated with the humor-based online PPIs, as this might be a fruitful approach. Humor-based PPIs might bear a potential, which has not been fully discovered thus far. The three parts of the thesis should elaborate on several questions about humor-based PPIs.

The Conceptualizations of Well-being and its Measurements

When conducting humor-based PPIs, the question of the dependent variable arises. The variables most frequently used to assess the effectiveness of PPIs are measures of well-being. Lay people differ in their perception of what contributes to happiness (Furnham & Cheng, 2000). Also, in the scientific literature many theories exist on how to define and operationalize (subjective) well-being. Marie Jahoda stated already in 1958 that mental health

is far more than the absence of mental illness. Also, the World Health Organization defines health in its constitution since 1948 as "[…] a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, p. 1).

In the psychological literature, different types of well-being are distinguished, such as subjective well-being, psychological well-being, and emotional well-being (for an overview see Eid & Larsen, 2008; Kahnemann, Diener, & Schwarz, 1999). Diener, Emmons, Larsen, and Griffin (1985) disentangled *subjective well-being* into a *cognitive* part – the satisfaction with life – and an *affective* part consisting of positive and negative affect. Based on this theory, the most well-known and widely used measure in the field, the *Satisfaction with Life-Scale* (SWLS), was developed to assess the cognitive part of subjective well-being – global life satisfaction – with five items on a seven-point Likert-style answer scale (Diener, Emmons, Larson, & Griffin, 1985). For the affective parts, the PANAS-scale is frequently used (Watson, Clark, & Tellegen, 1988), which assesses positive and negative affect with ten items each.

Another theory was established by Carol D. Ryff (1989), conceptualizing well-being as *psychological well-being*. The construct is based on six dimensions, namely self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth, which can be assessed with the so-called Ryff-scales with three to twenty items per dimension (Ryff, 1989). Keyes (2002) combines these approaches in his theory on a mental health continuum and suggests that mental health should be measured by emotional (i.e., subjective), psychological, and social well-being. Keyes (1998) argues for the inclusion of social well-being as earlier theories have neglected the fact that people are embedded in a social environment.

Finally, there is Seligman's conceptualization of happiness, in which he describes three different ways (or *orientations*) to happiness. In 2002, he postulated three basic ways to happiness in his *Authentic Happiness Theory*: The life of *pleasure* (i.e., doing things, which

are enjoyable), the life of *engagement* (i.e., doing things one is completely absorbed in, and during which one loses complete track of time; related to flow-experiences; see e.g., Csikszentmihalyi, 1990), and the life of *meaning* (i.e., doing something with a higher meaning, or that contributes to a meaningful life). Each of these ways can be pursued individually, however, they are not independent of each other. Peterson, Park and Seligman (2005b) developed an instrument to assess the three ways to happiness individually – the *Orientations to Happiness* scale (OTH) – with 6 items for each of the three orientations. A lot of research has been generated using the OTH, demonstrating the usefulness of the conceptualization in many different areas (e.g., Giannopoulos &Vella-Brodrick, 2011; Johnston, Luciano, Maggiori, Ruch, & Rossier, 2013; Pollock, Noser, Holden, & Zeigler-Hill, 2015; Ruch, Harzer, Proyer, Park, & Peterson, 2010; Schueller & Seligman, 2010; Ruch, Martínez-Martí, Heintz, & Brouwers, 2014). Recently, Seligman (2011) slightly changed and extended his theory to the PERMA-model. The main difference between this and the former theory is the addition of two further components: *Positive relationship*s and *accomplishment*. Additionally, he redefined pleasure as positive emotions, and hypothesized, that these five components constitute flourishing.

Based on Seligman's Authentic Happiness Theory, but broader in its scope, the *Authentic Happiness Inventory* (AHI) was especially constructed to track subtle changes in happiness and to be less prone to ceiling effects (Seligman, Steen, Park, & Peterson, 2005). Recently, Proyer, Gander, Wellenzohn, and Ruch (2015a) tested these specific assumptions of the AHI. They compared the AHI against the well-established SWLS and found the AHI to be more sensitive to upward changes in happiness. The AHI has also been used in a broad range of intervention studies (e.g., Andrewes, Walker, & O'Neill, 2014; Gander, Proyer, Ruch, & Wyss, 2013; Mongrain, Chin, & Shapira, 2011; Proyer, Gander, Wellenzohn, & Ruch, 2015a, 2015c; Proyer, Wellenzohn, Gander, & Ruch, 2015; Schueller, 2012; Senf & Liau, 2013; Shapira & Mongrain, 2010) as well as for other research purposes (e.g., Ding, Mullan, &

Xavier, 2014; Mullan & Xavier, 2013; Parks, Della Porta, Pierce, Zilca, & Lyubomirsky, 2012; Proyer, 2014; Ruch, Proyer, Harzer, Park, Peterson, & Seligman, 2010; Schiffrin & Nelson, 2010; Zabihi, Ketabi, Tavakoli, & Ghadiri, 2014). Thus, the AHI will be used to assess happiness in the intervention studies of the present thesis, besides a measurement to assess depressive symptoms; another variable that is commonly used as a dependent variable in positive psychology interventions, as can be seen in the next section.

Research Questions and Aims of the Present Thesis

As stated above, generally not a lot of research has been done on humor-based interventions, especially not with well-being and depressive symptoms as dependent variables (Ruch & McGhee, 2014). There is even less knowledge on self-administered humor-based positive psychology interventions (PPIs). To be more precise, to the best of the authors' knowledge and based on an extensive literature search described above, there is only one intervention tested that focuses on humor and that can be used without a trainer or a therapist instructing it, namely, the *three funny things* intervention (Gander et al., 2013; Proyer et al., 2014). With one tested intervention, the question whether humor-based PPI are effective when self-administered over the Internet cannot be answered reliably up until now. A first aim is, therefore, to replicate findings on the three funny things-intervention. A first and successful replication has been reported in Proyer, Gander, Wellenzohn, and Ruch (2014). However, one of the main aims of the present thesis is to develop and test new humor-based interventions, further investigate the question on whether humor-based PPIs work in a self-administered online intervention, or whether findings are restricted to the *three funny things* intervention. If findings cannot be extended, one might argue that participants probably not only focus on the *funny*, but also more generally on *good* things (as in the *three good things* intervention; Seligman et al., 2005). Since knowledge in the field is rather limited, an extension of the "toolbox" of humor-based self-administered online interventions seems warranted. This will be the main focus of Part I of the thesis.

A further aim is to take a closer look at possible moderators to elaborate *for whom* humor-based PPIs works best. Candidates for moderating effects are broad personality traits, and sense of humor itself (Part II). Given the small number of available studies, the question on why positive psychology interventions work is widely unanswered and will be addressed in Part III. , This part will mainly focus on establishing what the working mechanisms in humor-based PPIs are. Candidates for working mechanisms are positive emotions and attentional focus. The first one is also listed in the model by Lyubomirsky and Layous (2011; see Figure 1) and the latter could be assigned to positive thoughts in their model. Overall, the thesis aims at contributing to the understanding of this specific kind of PPI, namely humor-based positive psychology interventions.

Part I

First of all, the general question needs to be investigated: Are humor-based PPIs effective in enhancing happiness and ameliorating depressive symptoms in a placebo-controlled self-administered online setting? This will also provide insights into whether they can successfully be administered over the Internet (i.e., without receiving instructions in person, or a therapist instructing the activities). Thus far, only one self-administered humor-based PPI exists (*three funny things*; Gander et al., 2013; Proyer et al., 2014). Hence, it is unclear whether it is really the humor content that makes the intervention work, or whether it is the strategy (i.e., focusing on something positive and writing down three things about it in the evening) that is effective. New interventions are needed in order to investigate whether other strategies can also be used effectively within the framework of humor to enhance happiness and ameliorate depressive symptoms. Thus, building on the knowledge of humor research and merging it with different strategies tested in research in PPIs, well-established PPIs will become humor-based PPIs.

To develop new humor-based PPIs, I searched through the literature of PPIs for interventions that fulfilled several criteria. First of all, the effectiveness of an intervention in

enhancing well-being needed to be established. Secondly, an intervention needed to be suitable for a self-administered setting in a short (one week) period of time. Thus, intervention programs with several steps over a longer period of time, like the program by Fordyce (1977) or the Zurich Strengths Program (Proyer, Ruch, & Buschor, 2013), could not serve as a basis, at least not the whole program. Furthermore, the intervention needed to allow for an adaption to humor. Thus, the content needed to be exchangeable. This, for example, would not be possible with mindfulness-based interventions, as this needs a very specific mechanism (e.g., meditation). Finally, I wanted to develop various humor-based interventions that cover several modalities of humor, besides the appreciation of humor also humor production and moreover, using different implementation techniques. For the latter, I inspired my searching's also on McGhee's (2010a) intervention program to broaden the scope, with for example also including using humor in stressful situations. The idea of investigating several humor-based interventions simultaneously, should enable testing if the interventions work irrespective of the very specific intervention structure and modality and thus, would support the conclusion that humor-based interventions work. Furthermore, as certain interventions might not fit everyone, having several humor-based activities increases the probability to find a suitable one when thinking of applying the interventions in a coaching setting.

Having found several PPIs that fitted the mentioned criteria, I started reformulating them and exchanging the original contents with humor. Having the final intervention activities and instructions, I also added examples on how a daily entry in the activity logbook could look like, this might facilitate participants' start with the intervention. As it is well-known from research on humor, that people differ in the kinds of humor they prefer, I tried to consider different kinds of humor regarding the structure, for example non-sense and incongruity-resolution (Suls, 1983) and also regarding the medium and setting, for example experienced humorous situations, cartoons and jokes (Ruch, 2007). Thereby, I wanted the examples to be a broad inspiration to the participants, how they can conduct the intervention

and how they might make the intervention fit to their own preferences. The instructions and its origin of the newly developed humor-based PPIs are displayed in Table 1 of Part I.

After developing the new humor-based PPIs, the main aim of Part I is to test these interventions and replicate the findings for the three funny things intervention in a randomized placebo-controlled long-term intervention study. To do so, happiness and depressive symptoms will be assessed before the intervention at baseline, directly after completing the intervention and at one-month, three-months and six-months follow-up assessments to determine possible long-term changes also. Every intervention is expected to be effective compared to the placebo-control condition (for the placebo activity the frequently used *early memories*-activity by Seligman et al. [2005] is deployed). The dropouts will be considered, using the multiple imputations method by Allison (2001). The interventions effectiveness will be tested using ANCOVAs to compare each intervention condition first overall and second for the follow-ups individually against the placebo control condition, while controlling for baseline scores. Furthermore, for the completers only data set an analysis taking all intervention conditions together and comparing them against the placebo control group will be conducted, to report also an analysis, which is less prone to Type 1 errors.

Furthermore, it is an open question whether the fit between the intervention and the person conducting it plays a role for the effectiveness of humor-based PPIs. And if there are indicators of person × intervention-fit that are relevant, it is unclear whether these are the same indicators that are also predicting the effectiveness of other well-established PPIs, like the ones Proyer et al. (2014) found. Hierarchical regression analyses will be used for each indicator (Step 2), predicting happiness and depressive symptoms at the six months follow-up, while controlling for the pre-test scores in the first step.

Moreover, having new and tested PPIs contributes to a larger pool of possible PPIs to choose from. This is especially important, having the literature on the person × intervention-

fit in mind (i.e., Schueller, 2014), for enhancing the probability of finding a suitable intervention for a particular client. Thus, the present thesis can help practitioners (for example, psychologists working as therapists or coaches) use empirically tested interventions, and contributes to a scientifically based applied field of positive psychology.

Part II

Furthermore, it needs to be investigated whether a "one size fits all"-policy is applicable in humor-based positive psychology interventions, or whether there are certain traits that moderate the effectiveness of humor-based PPIs. This question is similar to the one in part I but investigating the person × intervention-fit from a different perspective. As introduced above, research in the field of PPIs has shown that basic personality traits can have moderating effects on the potency of the intervention, with different directions depending on the specific intervention (e.g., Schueller, 2012; 2014). Thus, it needs to be investigated whether this is also the case in humor-based PPIs.

Moreover, besides basic personality traits, one should also assume more specific traits, relating to the content of the intervention, to play a moderating role. Take, for example, the knowledge from humor research: The humor program by McGhee (2010a) consists of seven steps ordered by increasing difficulty. McGhee (2010b) stated that this slowly increasing difficulty is a crucial point if one wants to train the sense of humor. This assumes that some humor interventions might need a certain level of sense of humor in order to fruitfully develop and lead to positive effects. This might be especially important when considering self-administered interventions, where applicants cannot interact with an instructor in person. Thus, the level of the sense of humor is also investigated as a possible moderator in humor-based PPIs. Furthermore, testing several humor-based PPIs in one design can shed light on whether different moderators are relevant for different humor-based PPIs.

Part III

So far, not much is known about *how* humor-based interventions work and whether they generally all work in the same way (i.e., trigger the same working mechanisms). From the results of Part I of the present thesis, and based on other studies showing differences in the effectiveness among different PPIs, a new research question evolved. The study in Part I of the thesis makes it possible to differentiate between the humor-based PPIs, which are all based on different intervention strategies. A pattern was found according to which the time focus in humor-based PPIs might play a role in how effective the intervention is. The interventions focusing on the present or future (i.e., applying humor, three funny things, and collecting funny things) were more effective than the ones focusing on the past (i.e., collecting funny things and solving stressful situations in a humorous way). This new insight led to the hypothesis that the time focus of a humor-based PPI (and maybe this also applies to PPIs with other contents, as a similar pattern was observed in other PPI-studies) might trigger different working mechanisms. Therefore, in Part III, the influence of the time focus on the working mechanisms of humor-based PPIs is experimentally tested; by varying the time perspective in the instruction of the most established humor-based PPI, namely the three funny things intervention (Gander et al., 2013).

The *original* version of the intervention (for the full instructions see Table A of Part III) focusing on the *present* (i.e., the intervention has to be done at the moment), is expected to boost the two hypothesized mechanisms: Firstly, when writing down the three funny things that happened during the day, applicants might experience the positive emotions they experienced when the funny things happened again. Thus, the *savoring positive emotions*-mechanism might be triggered. This mechanism is expected to be triggered when interventions include a component focusing on past positive experiences. Secondly, during the day, applicants will turn their attention towards funny things, thus, this might trigger the mechanism of *shifting the attention to more positive things*. This mechanism is more likely to

be triggered if an intervention focuses on the future, and therefore the applicant is more likely to turn his attention to the things, which he or she is asked to think or write about, or also if the person is asked to do something in the spectrum of positive and pleasurable things.

For the purpose of developing a past and a future variant of the three funny things intervention, the instructions have been adapted, while keeping the variants as close as possible to the original. For the *past variant*, participants are asked to focus on the three funny things that happened on the same day in the week before. This is expected to trigger the *savoring*-mechanism, while remembering funny things that happened in the past, but dampening the shift-mechanism, since the participants are not encouraged to focus on funny experiences during the day. For the future variant, the opposite has been done, by asking the participants to compile a tally list, namely, making a tally every time something funny happens. This is expected to boost the shift-mechanism as the attention on the funny things might be increased, dampening the savoring-mechanism as participants do not need to remember or think about the funny things that happened.

It is expected that all three interventions are effective compared to a placebo control condition. The mechanisms are assessed with various specific items, and their levels of activation are compared between the groups. Finally, these precisely varied instructions will provide initial answers to the question whether the time focus triggers different working mechanisms in a humor-based PPI. Thus, the findings will give insights into *how* humor-based PPIs work, and implications for how to construct interventions with greater effectiveness can be drawn.

Part I:

Humor-based Online Positive Psychology Interventions:

A Randomized Placebo-controlled Long-term Trial

Sara Wellenzohn, René T. Proyer, & Willibald Ruch

Published as:

Wellenzohn, S., Proyer, R. T., & Ruch, W. (2016). Humor-based online positive psychology interventions: A randomized placebo-controlled long-term trial. *The Journal of Positive Psychology*, *11*(6), 584–594. doi:10.1080/17439760.2015.1137624

This is an Accepted Manuscript of an article published by Taylor & Francis Group in The Journal of Positive Psychologe on 15/12/2015, available online: http://www.tandfonline.com/doi/abs/10.1080/17439760.2015.1137624?journalCode=rpos20.

Abstract

While correlational evidence exists that humor is positively associated with well-being, only few studies addressed causality. We tested the effects of five humor-based activities on happiness and depression in a placebo-controlled, self-administered online positive psychology intervention (PPI) study (N = 632 adults). All of the five one-week interventions enhanced happiness, three for up to six months (i.e., three funny things, applying humor, and counting funny things), whereas there were only short-term effects on depression (all were effective directly after the intervention). Additionally, we tested the moderating role of indicators of a person×intervention-fit and identified early changes in well-being and preference (liking of the intervention) as the most potent indicators for changes six months after the intervention. Overall, we were able to replicate existing work, but also extend knowledge in the field by testing newly developed interventions for the first time. Findings are discussed with respect to the current literature.

Keywords. happiness; humor; online intervention; person × intervention fit; positive psychology intervention

Introduction

Humor plays an important role in people's lives. Recent years have seen an increased interest in the study of humor with a particular interest in its contribution to well-being (see e.g., Ruch & McGhee, 2014; Ruch, Rodden, & Proyer, 2011). One might argue that positive psychology is a "natural home" for the study of humor. For example, humor is listed as a strength of character assigned to the virtue of transcendence in Peterson and Seligman's (2004) *Values-in-Action* (VIA) classification although recent evidence suggests the strongest alignment to be with humanity (Beermann & Ruch, 2009; Müller & Ruch, 2011; Ruch & Proyer 2015). One of positive psychology's main aims is to study ways to promote human flourishing (Seligman, 2011). Two recent meta-analyses (Bolier et al., 2013; Sin & Lyubomirsky, 2009) showed that positive psychology interventions (PPIs; "[…] treatment methods or intentional activities that aim to cultivate positive feelings, behaviors, or cognitions", Sin & Lyubomirsky, 2009; p. 468) could be effective tools to achieve this aim. Up to now, however, only few humor-based interventions have been published.

Although it has been shown that the study of the relationship between humor and (facets of subjective) well-being has several pitfalls (Heintz & Ruch, 2015; Ruch & Heintz, 2014), humor seems to have a potential to contribute to people's well-being. For example, correlational studies using (self- and peer-ratings of) character strengths consistently show robust positive relations in the upper range of the VIA strengths (e.g., Buschor, Proyer, & Ruch, 2013; Park, Peterson, & Seligman, 2004; Proyer, Ruch, and Buschor, 2013; Proyer, Gander, Wellenzohn, & Ruch, 2013). Furthermore, the strength of humor contributes to better recovery after a history of physical illness (Peterson, Park, & Seligman, 2006). Vaillant (e.g., 2000) has argued that humor may contribute to healthy aging (as a mature *defense mechanism*). There are also humor-based programs in the elderly that are effective in ameliorating depression, anxiety, or pain (e.g., Ganz & Jacobs, 2014; Hirsch, Junglas,

Konradt, & Jonitz, 2010; Konradt, Hirsch, Jonitz, & Junglas, 2013; Low et al., 2013; for an overview see Ruch & McGhee, 2014), or in enhancing positive affect in habitants of residential homes (Houston, McKee, Carroll, & Marsh, 1998). Humor is also potent in inducing the positive emotion of amusement (Ruch, 2001, 2009), which may be helpful in the building of resources for well-being (Fredrickson, 1998). Only few humor-based interventions exist, which have been tested in non-clinical settings (for an overview see Ruch & McGhee, 2014). In an effort to narrow this gap, we have tested the potential of humor-based PPIs in a randomized, placebo-controlled, self-administered web-based setting.

Humor-based interventions and well-being in non-clinical samples

Most of the existing humor interventions are administered in group-settings (cf. Ruch & McGhee, 2014). For example, Lowis (1997) conducted a humor workshop consisting of five sessions aimed at learning how to use humor as a coping mechanism for life stress for people who recently went through stressful situations. Nevo, Aharonson, and Klingman (1998) conducted a 14-sessions program with a group of teachers, aimed at improving five different components of "sense of humor" and Ganz and Jacobs (2014) conducted a "humor therapy" workshop with elderly people without cognitive impairment attending senior centers. Moreover, McGhee developed a program to improve one's sense of humor for usage in group settings—"*The 7 Humor Habits Program*" (see McGhee, 2010a). The habits are structured with increasing difficulty (from "surround yourself with humor" to "find your humor in the midst of stress"). Crawford and Caltabiano (2011) administered the program over eight weeks and found increases in self-efficacy, positive affect, optimism, and perceptions of control. As well as decreases in self-rated depression, anxiety and stress levels in adults as compared with control groups (social activity and no-intervention group). These improvements lasted for up to three months after the training. McGhee (2010b) and Ruch and McGhee (2014) summarize further research conducted with the program.

Gander, Proyer, Ruch, and Wyss (2013) tested a variant of the *three good things* intervention (i.e., the *three funny things* intervention; writing down three *funny* things that happened during the day, every evening on seven consecutive days; see Table 1) in a self-administered, placebo-controlled online setting. They found increases in happiness at the one-month and three-months follow-up and an amelioration of depression at every follow-up time point (up to six-months) in comparison to the placebo control condition (writing about early memories). In a recent study Proyer, Gander, Wellenzohn, and Ruch (2014) replicated these findings in a sample of people aged 50 to 79 for depressive symptoms, but for happiness only for the six-months follow-up. Overall, the literature on humor-based PPIs is scarce, but findings are promising.

Developing self-administered humor-based interventions

Different structural models of humor have been proposed involving a different number of facets or components (e.g., Craik, Lampert, & Nelson, 1996; Ruch, 2012). While McGhee (2010b) proposed six humor skills (i.e., enjoyment of humor, laughter, verbal humor, humor in everyday life, laughing at yourself, humor under stress), psychometric studies (Köhler & Ruch, 1996; Müller & Ruch, 2011; Ruch & Carrell, 1998) show that these components mostly mark a strong factor of humor that typically unites "[…] enjoying humorous stimuli, finding humor in everyday life and even in one's own mishaps, enjoying cheerful interactions and telling jokes" (Ruch & Carrell, 1998; p. 555).

It was decided to "merge" classical PPIs with humor, but keep important distinctions (e.g., appreciation vs. production/reproduction of humor) intact and involve important facets that have health relevance (i.e., McGhee's skill of finding humor under stress). We tested new humor interventions that were based on the following well-established PPIs; (a) *gratitude visit*, (b) *counting kindnesses*, (c) *using signature strengths*, and (d) *one door closes*

and another door opens (see Table 1 for the paraphrased instructions; full instructions are available from the authors).

The *gratitude visit* was found to be effective up to one month with respect to happiness and depressive symptoms (Seligman, Steen, Park, & Peterson, 2005), and up to three months in a replication study (Gander et al. 2013). In the humor-based variant of this intervention (*collecting funny things*) participants were instructed to write in detail about the funniest things they had ever experienced, to describe the emotions felt during this event, and to write down who was present (i.e., focusing on humor appreciation). Participants were further encouraged to share the funny experience with someone who was present when it happened (see Table 1). The *counting kindnesses* intervention by Otake and colleagues (2006) was effective in enhancing happiness at the post-test and also at a three months follow-up, but no effects on depressive symptoms were reported in Gander et al. (2013). Participants in our study had to count the *funny things* that happened to them during the day and noted the total number each evening. Furthermore, we adapted the *using signature strengths* intervention, which was found to be effective for up to six-months, for both happiness and depression (e.g., Gander et al., 2013; Mongrain & Anselmo-Mathews, 2012; Seligman et al., 2005). Participants were instructed to focus on humor in their life and to use it in new ways (*applying humor*; i.e., humor production). Finally, we adapted the *one door closes another door opens*-intervention (Rashid & Anjum, 2008) for which Gander et al. (2013) found effects at the one and three-months follow-ups for happiness (no effects on depressive symptoms though). Our variant was the *solving stressful situations in a humorous way*-intervention: Participants were asked to search for and write about stressful situations in their past that they had resolved in a humorous way.

Table 1

Description of the Humor-based Interventions and the Placebo Control Condition.

Intervention	Instruction	Source/adapted from
Three funny things	Every evening participants had to write down the three funniest things they had experienced during the day and to describe the feelings during each of the experiences.	Three good things (Seligman et al., 2005): Writing down three good things that happened during the day. Adapted to the Three funny things by Gander et al., 2013.
Collecting funny things	Participants were instructed to remember one of the funniest things they have experienced in the past and to write it down in the most possible detail (every evening).	Gratitude visit (Seligman et al., 2005): Thank someone, who was especially kind in the past, by writing a letter in which one's gratitude is expressed, and deliver it to the person
Counting funny things	During the day participants counted all the funny things that happened during the day and to note the total number every evening.	Counting kindnesses (Otake et al., 2006): Keep track of daily-performed acts of kindness, counting them and summing them up each evening.
Applying humor	Participants were instructed to notice the humor experienced during the day and add new humorous activities like reading comics, jokes, watching funny movies etc.	Using signature strengths (Seligman et al., 2005): Taking the Values in Action Inventory of Strengths to assess the personal top strengths and then to apply these in new ways in one's daily life
Solving stressful situations in a humorous way	Participants had to think about a stressful experience during the day and about how it was (or could have been) solved in a humorous way.	One door closes and another door opens (Rashid and Anjum, 2008): Think about situations in the past, that went wrong but that nonetheless had positive outcomes, or situations in which the positive outcomes could not have even happened without the negative situation
Placebo control condition: Early memories	"Participants were asked to write about their early memories every night for one week."	Seligman et al. (2005; p. 416)

We excluded participants with elevated scores in depressive symptoms from this study (using the cut-off score in the CES-D at pre-test; Hautzinger, Bailer, Hofmeister, & Keller, 2012). All newly developed interventions require daily experiences with humor and those with elevated levels of depressive symptoms might find it difficult to embrace such experiences and to express them appropriately—at least in a self-administered setting with comparatively little interaction between the participants and the investigators. Other exclusion criteria were (a) being younger than 18, (b) currently seeing a therapist or taking psychotropic drugs, and (c) participating for professional reasons (e.g., being a journalist and wanting to report on the project). Of course, this leads to a reduction in the variance in one of the dependent variables, but as the measure we use has also been shown to be sensitive in lower levels of depression, we will still consider depression as a dependent variable in our study.

The role of the person × intervention-fit in humor-based interventions

As this is the first study with a clear focus on online humor-based interventions, we were also interested in how people work with these kinds of interventions. There is robust evidence that moderators exist, which contribute to the effectiveness of positive psychology interventions (e.g., Schueller, 2012; Schueller & Parks, 2012; Senf & Liau, 2013). We are especially interested in testing the impact of engagement and motivation on the effectiveness of the interventions (see Ruch & McGhee, 2014). Recently, Proyer, Wellenzohn, Gander, and Ruch (2015) examined indicators of a person × intervention-fit 3.5 years after conducting an online PPI. The liking of the intervention, its subjective benefit (i.e., preference), continuation above the instructed time period, the *effort* invested in the activities, but also an "early reactivity" predicted happiness (6%) and depressive symptoms (9%) after 3.5 years, while controlling for the respective baseline levels. We will evaluate the same indicators of the person × intervention-fit in this study for testing their role in humor-based interventions.

This study allows for an initial evaluation of newly developed humor-based positive psychology interventions; follow-ups are directly after the interventions as well as after one, three, and six months. The aim of the present study is threefold, (1) replicating Gander et al.'s (2013) findings for the *three funny things* intervention, (2) testing whether four newly developed interventions lead to an increase in happiness and an amelioration of depressive symptoms, and (3) investigating indicators of a person × intervention-fit on the long-term effectiveness of humor-based interventions. A power-analysis has shown that for detecting small effects with a power of ≥ .80, sample sizes of ≥ 100 participants per condition will be needed.

Method

Participants

A total of $N = 1{,}472$ (2,067 registered) participants completed the baseline measures (see Figure 1). Of these, 297 were excluded because they did not fulfill the inclusion criteria (three were younger than 18; 22 were currently seeing a psychotherapist or using psychotropic drugs; 250 were over the cut-off score in depression at baseline) and 60 did not fill-in the pre-test before the intervention. Overall, 632 (117 men, 515 women; $M = 47.4$, $SD = 11.6$; 18-80 years) completed all five-measurement points. They were rather well-educated with 41.5% holding a degree from a university and 19.1% from an applied university, 13.8% had a degree which allows them to attend university, 16.9% had vocational training, 5.2% had a degree which allows attending an applied university, and 3.5% had finished public school. We used the multiple imputations method (Allison, 2001) to estimate the missing data points. Thus, our analyses include all participants that have indicated the completion of all assignments ($N = 984$).

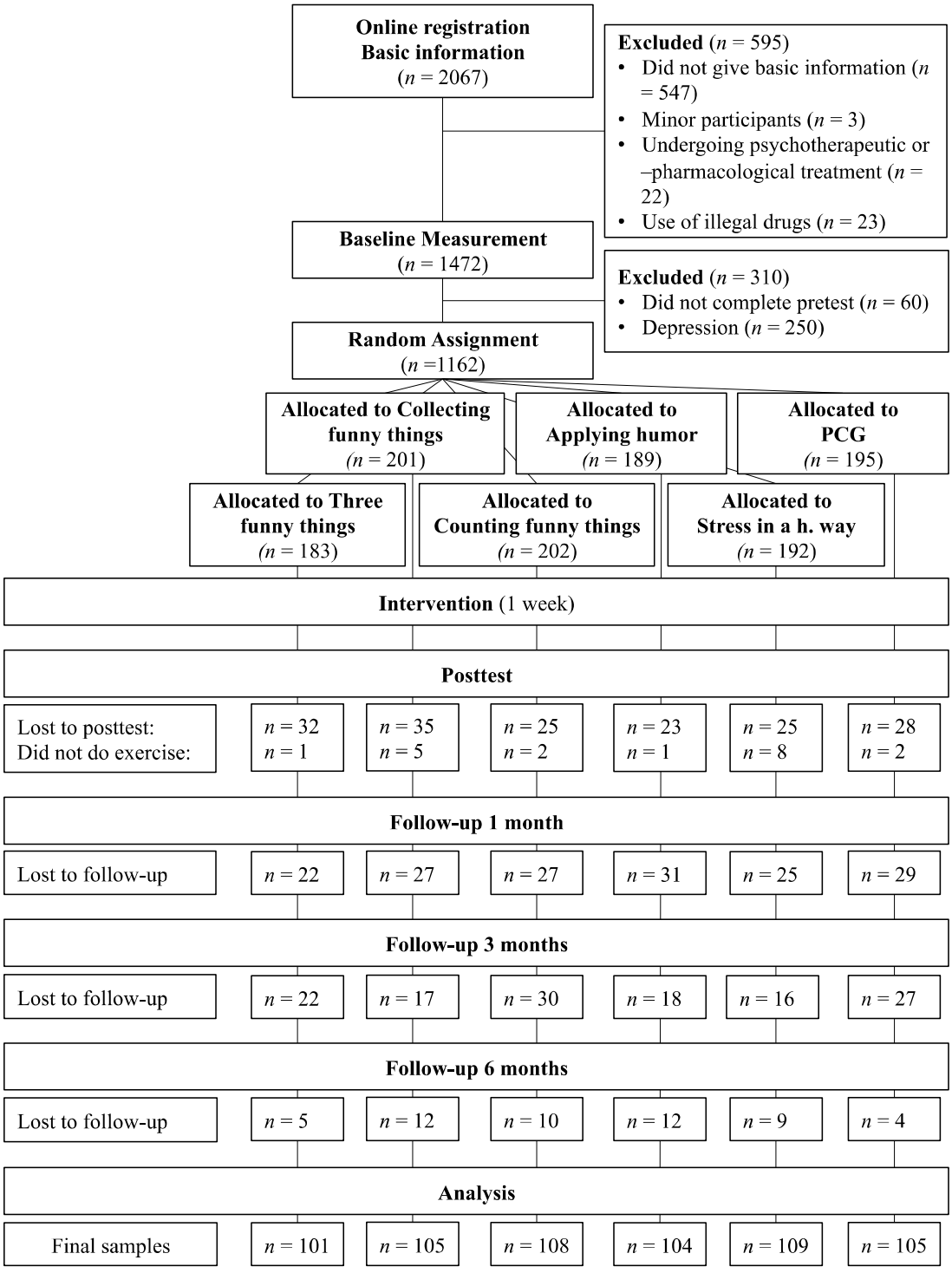


Figure 1. Flowchart of the participants

Procedure

The study was advertised as an online positive psychology training via leaflets and in local newspapers. In the advertisement, we avoided hinting at potential effects on well-being. Prospective participants were guided to the website for instructions and registration. They had to create a personal account, secured with a username and a password. At this point, participants were randomly (by an automated algorithm, based on a Mersenne-Twister) assigned to one of the six conditions (see Table 1).

After registration, participants filled in baseline assessments and demographics. They then clicked through some (8-10) slides about humor (an overview on what psychology knows about humor; e.g., definitions) or about childhood memories. At the end of this presentation, they were directed to a downloadable pdf-file with a summary of the presentation and detailed instructions on the intervention-activity with the request to print this document. Participants were instructed to pursue the activity during the next seven days. They were informed to come back to the website the day after the last day of training to describe how the training was (i.e., filling in the posttests—pre- and post intervention, and after one month, three and six months) and also received a reminder via email. Participants were not paid, but given personalized feedback on happiness and depressive symptoms over the six-months follow-up.

Instruments

The *Authentic Happiness Index* (AHI; Seligman et al., 2005; German version as used by Gander et al., 2013) assesses happiness with 24 statements arranged on five levels of agreement. A sample group of statements is from 1 = *I have sorrow in my life* to 5 = *My life is filled with joy*. The AHI has already been frequently used in intervention studies and demonstrated a high internal consistency of $\alpha = .93$ in this study.

The *Center of Epidemiologic Studies Depression Scale* (CES-D; Radloff 1977; German adaptation by Hautzinger, Bailer, Hofmeister, & Keller, 2012, 2012) was used to assess depressive symptoms. It consists of 20 items (e.g., "My sleep was restless") utilizing a four-point scale from 0 = *rarely or none of the time (less than 1 day)* to 3 = *most or all of the time (5-7 days)* and showed an internal consistency of $\alpha = .90$ in this study.

We followed Proyer et al.'s (2015) procedure for assessing the person × intervention-fit in positive psychology interventions. For *preference*, we asked how much the participants liked the intervention (from 1 = *not at all* to 7 = *very much*), and whether they saw a personal benefit and if so how strong it was (from 1 = *no, not at all* to 5 = *yes, very high*). At every follow-up time point we asked if they continued practicing their intervention voluntarily (*continuation*; from 0 = not continued over the one week to 3 = continued up to the 6-months follow-up). *Effort* was assessed via participants' invested time (from 1 = *less than 10 minutes* in 10 minutes steps to 20 = *more than 180 minutes*) and we asked whether they conducted the intervention as instructed (=2), or if they did less (=1), or more (=3). The changes in the AHI and in the CES-D from pre- to post-test (subtracting the pre-test score from the post-test score) were used as indicators of *early reactivity* in happiness and depressive symptoms.

Results

Preliminary Analyses

Of those who started their assigned activity, 54.4% completed all follow-ups. Participants who dropped out did not differ from the completers at baseline happiness ($t[1160] = 1.83$, $p = .07$), nor in depressive symptoms, $t(1160) = -1.27$, $p = .21$. The dropouts were on average 3.5 years younger ($t[1160] = 5.22$, $p < .001$, $d = 0.31$), but did not differ in terms of the gender ratio ($\chi^2(1, N = 1162) = 9.81$, $p = .08$), or their educational level, $\chi^2(1, N = 1162) = 16.54$,$p = .90$. The dropout rate across conditions was between 43.2% and 47.8% (Figure 1). There was no difference among the conditions, $\chi^2 (5, N = 1162) = 0.99$, $p = 0.96$.

Participants in the six conditions differed neither in their baseline levels of happiness (F[5, 978] = 1.00, p = .42), nor in depressive symptoms, F(5, 978) = 1.02, p = .40.

Effectiveness of the interventions

Table 2 gives all mean scores (and *SD*s) for all measurement time points for a first overview, using the pooled data set, resulting from the multiple imputations.

In general, Table 2 shows that mean levels of happiness increased numerically over time in all conditions. The mean levels of depressive symptoms decreased directly after the intervention in all conditions, but in the follow-ups they tended to return to the baseline level again.

The effectiveness in enhancing happiness as well as in ameliorating depressive symptoms was analyzed by comparing each intervention with the placebo control condition, using the multiple imputation data sets[1]. ANCOVAs were conducted with the follow-ups in happiness or depressive symptoms as dependent variables and their baseline levels as the covariate (see Table 3).

As shown in Table 3, all five humor-based interventions demonstrated positive overall effects for increases in happiness—a trend only for the *collecting funny things* intervention though. There were overall effects for all interventions on depression (trend only for *counting funny things*). Aside from pre-tests, this is the first study where these interventions were being fully tested. Therefore, we decided to test for effects at single time points despite having found single overall effects on the 10% level of significance only.

[1] When analyzing completers only, we found a main effect of the condition (humor-based intervention vs. placebo condition) on happiness (F(1, 629) = 4.48, p < .05, η^2 = .01), but not on depressive symptoms, F(1, 629) = 0.98, p = 0.35. Furthermore, we found the three funny things at the one and three months follow-up, and the counting funny things and the applying humor intervention at every follow-up to be effective in enhancing happiness, all three also showing overall effects. However, no overall effects for depressive symptoms were found, only applying humor was found to ameliorate depressive symptoms at post and one month follow-up and solving stressful situations in a humorous way showed trends at post and three months follow-up.

Table 2

Means and Standard Deviations for the Humor-based Interventions and the Placebo Control Condition at the Five Time Periods for Happiness and Depressive Symptoms Based on the Multiple Imputation Data Set.

		Pre		Post		1 M		3 M		6 M	
	N	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Happiness											
Three funny things	151	76.66	11.06	78.00	11.63	78.26	13.02	78.92	12.91	80.16	13.10
Collecting funny things	164	75.72	11.11	76.71	11.64	76.32	12.57	76.13	13.34	77.47	13.26
Counting funny things	176	75.07	12.51	76.97	12.77	77.54	13.96	78.29	13.73	75.07	14.08
Applying humor	165	74.04	11.32	76.70	12.09	77.61	12.61	77.13	13.21	77.43	13.67
Solving stressful situations in a humorous way	162	75.75	11.19	76.90	12.25	76.75	12.58	77.73	11.93	77.25	13.04
PCC	166	74.67	12.47	74.17	13.35	74.24	14.30	74.89	14.26	75.76	13.85
Depressive Symptoms											
Three funny things	151	9.75	5.72	8.77	6.23	10.40	8.25	10.36	8.26	9.37	8.57
Collecting funny things	164	11.00	6.02	9.75	7.10	10.28	8.07	11.32	8.75	11.17	9.09
Counting funny things	176	10.51	5.89	9.69	6.61	10.64	8.16	10.60	8.86	10.86	8.46
Applying humor	165	10.61	5.92	9.52	6.57	9.32	6.66	11.22	7.95	11.21	8.85
Solving stressful situations in a humorous way	162	10.02	5.76	9.38	6.99	10.29	8.34	9.80	7.37	10.32	8.37
PCC	166	10.72	5.30	11.02	7.35	12.16	8.68	12.01	9.13	10.85	8.48

Note. Happiness = Authentic Happiness Inventory, Depressive Symptoms = Center for Epidemiologic Studies Depression Scale; PCC = Early memories. 1 M = one month after the intervention, 3 M = three months after the intervention, 6 M = six months after the intervention.

Table 3

ANCOVAs with the Intervention Condition (Humor-based Intervention × Placebo Control Condition) and Time (Happiness or Depressive Symptoms) Controlled for the Respective Baseline-Scores Based on the Multiple Imputation Data Set.

		ANCOVA			ANCOVAs for each time point			
					Post	1 M	3 M	6 M
	N	*df*	*t*	R^2	*t*	*t*	*t*	*t*
Happiness								
Three funny things	151	2, 314	3.05**	.09	2.71**	2.01*	2.18*	2.26*
Collecting funny things	164	2, 327	1.31†	.04	2.09*	1.16	-0.29	0.79
Counting funny things	176	2, 339	3.59***	.11	3.30***	2.78**	2.84**	2.02*
Applying humor	165	2, 328	3.91***	.12	4.05***	3.73***	2.45**	2.16*
Solving stressful situations in a humorous way	162	2, 325	1.90*	.06	2.30*	1.56†	1.68†	0.53
Depressive Symptoms								
Three funny things	151	2, 314	1.90*	.09	-2.45**	-1.14	-0.90	-0.81
Collecting funny things	164	2, 327	1.87*	.08	-2.13*	-2.37**	-0.82	0.14
Counting funny things	176	2, 339	1.60†	.07	-1.83*	-1.60†	-1.36†	0.13
Applying humor	165	2, 328	1.89*	.09	-2.22**	-3.35***	-0.67	0.47
Solving stressful situations in a humorous way	162	2, 325	1.94*	.09	-1.70*	-1.46†	-1.65†	-0.10

Note. Happiness = Authentic Happiness Inventory, Depressive Symptoms = Center for Epidemiologic Studies Depression Scale; 1 M = one month after the intervention, 3 M = three months after the intervention, 6 M = six months after the intervention; Placebo Control Condition $n = 166$.

†$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (one-tailed).

We conducted ANCOVAs for each follow-up time point separately, comparing the interventions with the placebo control condition. As shown in Table 3, the *three funny things* intervention, *counting funny things*, and *applying humor* were effective in enhancing happiness at all follow-up time points. The *collecting funny things*- and the *solving stressful situations in a humorous way* intervention were only effective directly after the intervention, with the latter showing a trend at the one and three months time point. Overall, all tested humor-based interventions were at least at one time point effective for increasing happiness (two out of the five tested at the post-test only though).

For depressive symptoms, all of the humor-based interventions were effective, directly after the intervention. The *collecting funny things* and the *applying humor* interventions were also effective at the one month follow-up. There were trends for the *counting funny things* and the *solving stressful situations in a humorous way* intervention one and three months after the intervention-week.

Moderators of the effectiveness of the humor-based positive psychology interventions

For testing potential moderators of the effectiveness of the humor-based interventions, we conducted separate hierarchical regression analyses for each of the seven fit indicators (Step 2) predicting happiness and depressive symptoms at the six-months follow-up, while controlling for the baseline levels in Step 1 (see Table 4).

Table 4 shows that every indicator of the person × intervention-fit pointed in the expected direction. *Early reactivity* in happiness (8% incremental variance predicted) was the best predictor for happiness, but also early reactivity in depression as well as *liking* and *benefit* (i.e., indicators of preference), *continuation,* and early reactivity in depression contributed to the prediction (about 1%). As expected, the contribution for the prediction of depression was lower, but *early reactivity* (both happiness and depression), and *continuation* invested contributed (about 1 - 4% each) contributed to the prediction.

Table 4

Hierarchical Regression Analyses of Happiness and Depressive Symptoms at the Six-Months Follow-Up on Indicators of a Person × Intervention-Fit (Separately) for Humor-based Positive Psychology Interventions, Controlled for Baseline Scores in Step 1, Based on the Multiple Imputation Data Set.

		Regression (Step 2)			
		Happiness after 6 months		Depressive Symptoms after 6 months	
Indicators	*df*	ΔF	ΔR^2	ΔF	ΔR^2
Preference					
Liking	2, 815	3.69***	.01	1.22	.00
Benefit	2, 815	3.81***	.01	2.39**	.01
Continuation					
	2, 815	2.62**	.01	2.07*	.01
Effort					
Instruction	2, 815	0.53	.00	0.74	.00
Time	2, 815	1.79*	.00	1.57†	.00
Early reactivity					
Reactivity AHI	2, 815	12.00***	.08	2.35**	.01
Reactivity CES-D	2, 815	5.00***	.01	6.37*	.04

Note. $N = 817$. Liking: How much participants liked the exercise (1 = not at all, 7 = very much); Benefit: How much participants subjectively benefitted from the exercise (1 = not at all, 7 = very much); Continuation = Continued practicing up to one, three, or six months; Instruction: Did less than instructed (=0) or did as much or more than instructed (=1); Time: Total amount of time spent with the exercise during the intervention week; Reactivity AHI / CES-D: Differences between the posttest and the pretest in the Authentic Happiness Inventory and the Center for Epidemiological Studies Depression Scale, respectively.

†$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (one-tailed)

We also conducted a joint analysis using all person × intervention-fit indicators for the prediction of happiness and depression, respectively. For this, we computed hierarchical regression analyses, in which the pre-test scores were entered in a first step, and all person × intervention-fit indicators in a second step. The results are not shown in detail, but are available in the supplementary material online (Table A). Together, all the person × intervention-fit indicators explained 8 - 9% of the variance in happiness at the six-months

follow-up, and 5 - 6% of the variance in depressive symptoms after controlling for the pre-test scores; best predictors were *early reactivity in happiness* (t[809] = 9.81, $p < .001$) and *early reactivity in depression* (t[809] = 5.09, $p < .001$) for happiness and depressive symptoms, respectively. Additionally, *continuing* the intervention also predicted enhanced happiness and ameliorated depressive symptoms.

Discussion

The present study contributes to the as of yet limited literature on humor-based positive psychology interventions (PPIs), especially, in self-administered online settings. It replicates and extends prior findings (Gander et al., 2013) by testing new humor-based interventions. Earlier studies (for an overview see Ruch & McGhee, 2014) have already pointed out that there is a potential in these types of interventions for people's well-being. This is the first study to test a broader range of self-administered humor-based PPIs in a randomized placebo-controlled online trial.

The results of this study show that, aside from the already tested *three funny things*-intervention, the four newly developed interventions (*collecting funny things*, *counting funny things*, *applying humor, and solving stressful situations in a humorous way*) were effective in enhancing happiness— *three funny things*, *collecting funny things* and *applying humor* were the most potent by showing effects at all follow-up time points. All of the humor-based interventions were also effective in ameliorating depressive symptoms; however, only directly after the intervention and generally with smaller effects.

The *applying humor* intervention is based on the *using signature strengths in a new way* intervention (Seligman et al., 2005). A major difference is that in the signature strengths intervention, participants need to focus on their *highest* strengths, but in this variant, they need to focus on humor *irrespective* of their own humorousness. The findings support the notion that applying humor in a new way in everyday life seems beneficial for those high *or*

low in humor. One might argue that simply acting like being a humorous person might already contribute to one's well-being (cf. Fordyce, 1977). This is in line with research published by Fleeson, Malanos, and Achille (2002) who found that *acting* extravert (irrespective of ones expression in extraversion) is associated with experiencing more positive affect. Similarly, Proyer, Gander, Wellenzohn, and Ruch (2015) found that not only a *signature strengths*, but also a *lesser strengths* intervention (i.e., participants were instructed to apply their lowest strengths–assessed with the Values in Action Inventory of Strengths–in their daily life) was effective in enhancing happiness and ameliorating depressive symptoms in a placebo controlled online study. Unfortunately, we are not able to control for baseline levels of humor in the present study, but the finding may suggest that the intervention could be equally effective for those low or high in humor. In fact, Wellenzohn, Proyer, and Ruch (2015) found no moderating role of the sense of humor (assessed via McGhee's Sense of Humor scale, 2010a) for humor-based PPIs. However, there it was shown that the *three funny things* intervention was more effective for extraverts. Thus, basic personality traits might also moderate the effects and this warrants attention in future studies.

The findings for the *counting funny things* intervention are comparable with findings for the *counting kindnesses* intervention (Otake et al., 2006). In fact, the humor-based variant demonstrated more sustainable effects for happiness. Keeping the spillover effects in mind, that Otake et al. (2006) found for the *counting kindnesses* intervention (on gratitude and performing acts of kindness), one might expect similar effects on traits related to *counting funny things* such as performing more humorous acts (e.g., telling jokes, making others laugh). The consequences of shared humor (e.g., spending more time with others, strengthening social bonds) might also support the long-term effects. All interventions were well-received; the drop-out rate (46% after six months) was smaller than in comparative

studies (e.g., up to 69% at post-test and up to 79% at six months intervals in Mitchell et al., 2010).

As mentioned, there were short-term effects on depression only—contrary to the expectation also for the *three funny things* intervention. When comparing sample characteristics across the three studies where this intervention has been used (i.e., the present study; Gander et al., 2013; Proyer et al., 2014), the baseline levels of depression seem to differ. Obviously levels of depression were lowest in this study, because we excluded those participants above a (sensitive) threshold for depression. However, one might argue that depressive symptoms may have a moderating role in the effectiveness of the interventions and that the restriction in the variance in the dependent variable had an impact on the findings. Nevertheless, we found short-term effects for depression in this study. This is in line with findings for humor-based programs that were also effective in depressed patients (e.g., Falkenberg, Buchkremer, Bartels, & Wild, 2011; Konradt et al., 2013). Overall, results for the replication of the findings for the *three funny things*-intervention were mixed, as we could replicate the ameliorating effects on depressive symptoms only in the short-term (findings for happiness were replicated though).

Core characteristics of the effective interventions

The common core of the most effective interventions (i.e., *counting funny things*, *applying humor*, and *three funny things*) is that they require the participants to focus on humor experienced on the *present* day of the intervention – a *positive focus on the presence*. For example, one needs to notice funny things during one's day to be able to count them. This idea resembles studies on the *positive information-processing bias* (see Sanchez & Vazquez, 2014) and its relation to positive mood (see Sanchez, Vazquez, Gomez, & Joormann, 2014) or the *attentional preference* (Peters, Vieler, & Lautenbacher, 2015). Hence, favoring positive over negative information seems a contributing factor. Wadlinger and

Isaacowitz (2011) describe attentional deployment as a modifiable strategy of emotion regulation, which could be used in trainings to enhance the experience of positive emotions. The interventions might be useful to shift the attentional focus; in the same line as suggested for positive psychotherapy by Seligman, Rashid and Parks (2006).

One might also argue for a *savoring* component while experiencing the positive emotions again that have happened during the remembered events. This is very much in the sense of a positive rumination about the funny things experienced during the day (Quoidbach, Berry, Hansenne, & Mikolajczak, 2010). Of course, this also relates to what has been described in the Fredricksons's (1998) broaden and build theory of positive emotions.

Overall, we argue in favor of these two mechanisms (the positive focus on the presence and the savoring component) as being core to the intervention's effectiveness. The *savoring* component might also play a role in the *collecting funny things*-intervention, but it seems more focused on the past than on the present. In contrast, the intervention to *solve stressful situations in a humorous way* requires a focus on the *presence*, but *not* on *positive* things (rather on stressful situations). To complete the instructed activity, one needs to focus on stressful situations during the day to be then able to solve them in a humorous way. Consequently, this focus on stressful situations might dampen the effect on well-being. Even if humor has been shown to facilitate amusement (Ruch, 2001), participants may have selected an event, which was not fully resolved with the usage of humor. Therefore, the instruction of the intervention may be improved by a stronger focus on solving situations in a humorous way, or just slightly stressful situations, which might be easier to solve.

How do participants work with the humor-based positive psychology interventions?

We identified person × intervention-fit indicators, which have contributed to the interventions' effectiveness. Early changes in happiness and depressive symptoms were the most potent predictors of the effectiveness of humor-based interventions at the six months

follow-up, when controlled for the baseline scores. This fits well to what we have found in an earlier study using a 3.5 years interval (Proyer et al., 2015). These were followed in importance by indicators of *preference* and *continuing* the exercises longer than the intervention-week. In more adaptive settings, such information could be used to predict a participants' gain from an intervention s/he has started and may lead to a re-assignment to an intervention, which has a better fit for the person.

Limitations and Future Directions

Although, the present study is based on comparatively large sample sizes the sample consisted of people interested in working on positive interventions on a self-selected basis. Hence, the generalizability of the results is limited. However, we tested the interventions in a randomized placebo-controlled design, so the participants in the placebo control condition had the same expectations and interests. A further advantage of the present study is the online administration. Crawford and Caltabiano (2011) formulated concerns about the effects a group setting might have in humor-based PPIs (e.g., the personality of the person guiding the program, or other interactions among the participants than those intended). Overall, effect sizes were rather low and should not be over-interpreted.

Current research on humor also considers its possible detrimental sides (e.g., using humor to laugh at someone or extensive levels of fearing to be laughed at; e.g., Ruch, Hofmann, Platt, & Proyer, 2014). We do not know what kind of funny things the participants count, do, or think of, when they are conducting the exercises. Thus, one needs to be cautious when disseminating humor-based PPIs. We already considered this, when formulating the instructions, having in mind that different kinds of people appreciate different kinds of humor (Ruch, 2012). For example, people may have different perceptions of what they find funny—we did not instruct participants to favor one specific type of humor over another. In future studies, one might consider asking the participants to hand in their assignments to get more

insights on how they actually work with the different interventions. It might also be advisable to focus on a specific kind of humor, for which positive relationships with well-being have been established. Finally, we developed our interventions parallel to existing ones. Other strategies for the development of humor-based interventions, however, might be even more effective.

A further question is whether happiness and depressive symptoms are the best and most self-evident outcome variables in studies such as this one. One could also think of more proximate outcomes of humor-based PPIs which aim at increasing the participants' senses of humor (McGhee, 2010b) or other traits which might also contribute to well-being (e.g., serenity, or cheerfulness; e.g., Ruch, Köhler, & Van Thriel, 1997).

The present study outlines and extends the knowledge about humor-based PPIs and shows their potential. Research in this area is, however, still at the very beginning, nonetheless findings reported in literature and in the study described here are promising and encourage further work in this line of research.

References

Allison, P. D. (2001). *Missing data: Series: Quantitative applications in the social sciences*. Thousand Oaks, CA: SAGE.

Beermann, U., & Ruch, W. (2009). How virtuous is humor? What we can learn from current instruments. *The Journal of Positive Psychology*, *4*, 528–539. doi:10.1080/17439760903262859

Bolier, L., Haverman, M., Westerhof, G. J., Riper, H., Smit, F., & Bohlmeijer, E. (2013). Positive psychology interventions: A meta-analysis of randomized controlled studies. *BMC Public Health*, *13*, 119. doi:10.1186/1471-2458-13-119

Buschor, C., Proyer, R. T., & Ruch, W. (2013). Self- and peer-rated character strengths: How do they relate to satisfaction with life and orientations to happiness? *The Journal of Positive Psychology*, *8*, 116–127. doi:10.1080/17439760.2012.758305

Craik, K. H., Lampert, M. D., & Nelson, A. J. (1996). Sense of humor and styles of everyday humorous conduct. *Humor: International Journal of Humor Research*, *9*, 273–302.

Crawford, S. A., & Caltabiano, N. J. (2011). Promoting emotional well-being through the use of humour. *The Journal of Positive Psychology*, *6*, 237–252. doi:10.1080/17439760.2011.57708

Falkenberg, I., Buchkremer, G., Bartels, M., & Wild, B. (2011). Implementation of a manual-based training of humor abilities in patients with depression: A pilot study. *Psychiatry Research*, *186*(2–3), 454–457. doi:10.1016/j.psychres.2010.10.009

Fleeson, W., Malanos, A. B., & Achille, N. M. (2002). An intraindividual process approach to the relationship between extraversion and positive affect: Is acting extraverted as "good" as being extraverted? *Journal of Personality and Social Psychology*, *83*(6), 1409–1422. doi:10.1037//0022-3514.83.6.1409

Fordyce, M. W. (1977). Development of a program to increase personal happiness. *Journal of Counseling Psychology, 24,* 511–521.

Fredrickson, B. L. (1998). What good are positive emotions? *Review of General Psychology*, *2*, 300–319. doi:10.1037/1089-2680.2.3.300

Gander, F., Proyer, R. T., Ruch, W., & Wyss, T. (2013). Strength-based positive interventions: Further evidence for their potential in enhancing well-being and alleviating depression. *Journal of Happiness Studies, 14*, 1241–1259. doi:10.1007/s10902-012-9380-0

Ganz, F. D., & Jacobs, J. M. (2014). The effect of humor on elder mental and physical health. *Geriatric Nursing, 35*(3), 205–211. doi:10.1016/j.gerinurse.2014.01.005

Hautzinger, M., Bailer, M., Hofmeister, D. & Keller, F. (2012). *Allgemeine Depressionsskala (ADS)* [General Depression Scale] (2nd ed.) Göttingen, Germany: Hogrefe.

Heintz, S., & Ruch, W. (2015). An examination of the convergence between the conceptualization and the measurement of humor styles: A study of the construct validity of the Humor Styles Questionnaire. *Humor: International Journal of Humor Research, 28*, 611-633. doi:10.1515/humor-2015-0095

Hirsch, R. D., Junglas, K., Konradt, B., & Jonitz, M. F. (2010). Humortherapie bei alten Menschen mit einer Depression: Ergebnisse einer empirischen Untersuchung. [Humor therapy in the depressed elderly. Results of an empirical study]. *Zeitschrift für Gerontologie und Geriatrie*, *43*, 42–52. doi:10.1007/s00391-009-0086-9

Houston, D., McKee, K., Carroll, L., & Marsh, H. (1998). Using humour to promote psychological wellbeing in residential homes for older people. *Aging & Mental Health*, *2*, 328–332. doi:10.1080/13607869856588

Konradt, B., Hirsch, R. D., Jonitz, M. F., & Junglas, K. (2013). Evaluation of a standardized humor group in a clinical setting: a feasibility study for older patients with depression:

Humor therapy for older patients with depression. *International Journal of Geriatric Psychiatry*, *28*, 850–857. doi:10.1002/gps.3893

Köhler, G., & Ruch, W. (1996). Sources of variance in current sense of humor inventories: How much substance, how much method variance? *HUMOR*, *9*, 363–398. doi:10.1515/humr.1996.9.3-4.363

Low, L.-F., Brodaty, H., Goodenough, B., Spitzer, P., Bell, J.-P., Fleming, R., … Chenoweth, L. (2013). The Sydney multisite intervention of laughterbosses and elderclowns (SMILE) study: cluster randomised trial of humour therapy in nursing homes. *BMJ Open*, *3*(1), e002072. doi:10.1136/bmjopen-2012-002072

Lowis, M. J. (1997). A humor workshop program to aid coping with life stress. *Mankind Quarterly, 38(1/2),* 25.

McGhee, P. E. (2010a). *Humor as survival training for a stressed-out world: The 7 humor habits program.* Bloomington, IN: Author House.

McGhee, P. E. (2010b). *Humor: The lighter path to resilience and health.* Bloomington, IN: Author House.

Mitchell, J., Vella-Brodrick, D., & Klein, B. (2010). Positive psychology and the internet: A mental health opportunity. *Electronic Journal of Applied Psychology, 6(2),* 30–41. doi:10.7790/ ejap.v6i2.230

Mongrain, M., & Anselmo-Matthews, T. (2012). Do positive psychology exercises work? A replication of Seligman et al. (2005). *Journal of Clinical Psychology*, *68*, 382–389. doi:10.1002/jclp.21839

Müller, L., & Ruch, W. (2011). Humor and strengths of character. *The Journal of Positive Psychology*, *6*, 368–376. doi:10.1080/17439760.2011.592508

Nevo, O., Aharonson, H., & Klingman, A. (1998). The development and evaluation of a systematic program for improving sense of humor. In W. Ruch (Ed.), *The sense of*

humor: Exploration of a personality characteristic (pp. 385-404). New York, NY: Mouton de Gruyter.

Otake, K., Shimai, S., Tanaka-Matsumi, J., Otsui, K., & Fredrickson, B. L. (2006). Happy people become happier through kindness: A counting kindnesses intervention. *Journal of Happiness Studies*, *7*, 361–375. doi:10.1007/s10902-005-3650-z

Park, N., Peterson, C., & Seligman, M. E. (2004). Strengths of character and well-being: A closer look at hope and modesty. *Journal of Social and Clinical Psychology*, *23*, 628–634. doi:10.1521/jscp.23.5.628.50749

Peters, M. L., Vieler, J. S. E., & Lautenbacher, S. (2015). Dispositional and induced optimism lead to attentional preference for faces displaying positive emotions: An eye-tracker study. *The Journal of Positive Psychology*. doi:10.1080/17439760.2015.1048816

Peterson, C., Park, N., & Seligman, M. E. P. (2006). Greater strengths of character and recovery from illness. *The Journal of Positive Psychology*, *1*, 17–26. doi:10.1080/17439760500372739

Peterson, C., & Seligman, M. (2004). *Character strengths and virtues: A handbook and classification*. Washington, DC: New York: American Psychological Association / Oxford University Press.

Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2013). What good are character strengths beyond subjective well-being? The contribution of the good character on self-reported health-oriented behavior, physical fitness, and the subjective health status. *The Journal of Positive Psychology*, *8*, 222–232. doi:10.1080/17439760.2013.777767

Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2014). Positive psychology interventions in people aged 50–79 years: long-term effects of placebo-controlled

online interventions on well-being and depression. *Aging & Mental Health, 18*, 997-1005. doi:10.1080/13607863.2014.899978

Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2015). Strengths-based positive psychology interventions: A randomized placebo-controlled online trial on long-term effects for a signature strengths- vs. a lesser strengths-intervention. *Frontiers in Psychology*, *6*, 456. doi:10.3389/fpsyg.2015.00456

Proyer, R. T., Ruch, W., & Buschor, C. (2013). Testing strengths-based interventions: A preliminary study on the effectiveness of a program targeting curiosity, gratitude, hope, humor, and zest for enhancing life satisfaction. *Journal of Happiness Studies*, *14*, 275–292. doi:10.1007/s10902-012-9331-9

Proyer, R. T., Wellenzohn, S., Gander, F., & Ruch, W. (2015). Toward a better understanding of what makes positive psychology interventions work: Predicting happiness and depression from the person × intervention fit in a follow-up after 3.5 years. *Applied Psychology: Health and Well-Being*, *7*, 108–128. doi:10.1111/aphw.12039

Quoidbach, J., Berry, E. V., Hansenne, M., & Mikolajczak, M. (2010). Positive emotion regulation and well-being: Comparing the impact of eight savoring and dampening strategies. *Personality and Individual Differences*, *49*, 368–373. doi:10.1016/j.paid.2010.03.048

Radloff, L. S. (1977). The CES-D scale. A self-report depression scale for research in the general population. *Applied Psychological Measurement*, *1*, 385–401. doi:10.1177/014662167700100306

Rashid, T., & Anjum, A. (2008). Positive psychotherapy for young adults and children. In J. R. Z. Abela & B. L. Hankin (Eds.), *Handbook of depression in children and adolescents* (pp. 250–287). New York, NY: Guilford.

Ruch, W. (2001). The perception of humor. In A. W. Kaszniak (Ed.), *Emotion, Qualia, and Consciousness* (pp. 410–425). Tokyo, Japan: Word Scientific Publisher.

Ruch, W. (2009). Amusement. In D. Sander, & K. Scherer (Eds). *The Oxford Companion to the Affective Sciences* (pp. 27-28). New York, NY: Oxford University Press.

Ruch, W. (2012). Towards a new structural model of the sense of humor: Preliminary findings. In *AAI Symposium on Artificial Intelligence of Humor Proceedings* (pp. 2–4). Retrieved from http://www.aaai.org/ocs/index.php/FSS/FSS12/paper/viewFile/5652/5809

Ruch, W., & Carrell, A. (1998). Trait cheerfulness and the sense of humour. *Personality and Individual Differences, 24,* 551–558. doi:10.1016/S0191-8869(97)00221-3

Ruch, W., & Heintz, S. (2014). Humour styles, personality, and psychological well-being: What's humour got to do with it? *European Journal of Humour Research, 1*(4), 1–24. Retrieved from http://europeanjournalofhumour.org/index.php/ejhr/article/view/35

Ruch, W., Hofmann, J., Platt, T., & Proyer, R. (2014). The state-of-the art in gelotophobia research: A review and some theoretical extensions. *Humor: International Journal of Humor Research*, *27*, 23–45. doi:10.1515/humor-2013-0046

Ruch, W., Köhler, G., & Van Thriel, C. (1997). To be in good or bad humour: Construction of the state form of the State-Trait-Cheerfulness-Inventory—STCI. *Personality and Individual Differences*, *22*, 477–491. doi:10.1016/S0191-8869(96)00231-0

Ruch, W., & McGhee, P. E. (2014). Humor intervention programs. In A. C. Parks & S. Schueller (Eds.), *The Wiley Blackwell Handbook of positive psychological interventions* (1. ed., pp. 179–193). West Sussex, UK: John Wiley & Sons.

Ruch, W., & Proyer, R. T. (2015). Mapping strengths into virtues: the relation of the 24 VIA-strengths to six ubiquitous virtues. *Frontiers in Psychology*, *6*. doi:10.3389/fpsyg.2015.00460

Ruch, W., Rodden, F. A., & Proyer, R. T. (2011). Humor and other positive interventions in medical and therapeutic settings. In Kirkcaldy, Bruce D. (Ed.), *The art and science of health care: Psychology and human factors for practitioners*. Göttingen, Germany: Hogrefe.

Sanchez, A., & Vazquez, C. (2014). Looking at the eyes of happiness: Positive emotions mediate the influence of life satisfaction on attention to happy faces. *The Journal of Positive Psychology*, *9*, 435–448. doi:10.1080/17439760.2014.910827

Sanchez, A., Vazquez, C., Gomez, D., & Joormann, J. (2014). Gaze-fixation to happy faces predicts mood repair after a negative mood induction. *Emotion, 14*, 85–94. doi:10.1037/a0034500

Schueller, S. M. (2012). Personality fit and positive interventions: Extraverted and introverted individuals benefit from different happiness increasing strategies. *Psychology*, *03*, 1166–1173. doi:10.4236/psych.2012.312A172

Schueller, S. M., & Parks, A. C. (2012). Disseminating self-help: Positive psychology exercises in an online trial. *Journal of Medical Internet Research*, *14*(3), e63. doi:10.2196/jmir.1850

Seligman, M. (2011). *Flourish*. New York, NY: Free Press.

Seligman, M. E. P., Rashid, T., & Parks, A. C. (2006). Positive psychotherapy. *American Psychologist*, *61*, 772–788. doi:10.1037/0003-066X.61.8.772

Seligman, M. E. P., Steen, T. A., Park, N., & Peterson, C. (2005). Positive psychology progress: Empirical validation of interventions. *American Psychologist*, *60*, 410–421. doi:10.1037/0003-066X.60.5.410

Senf, K., & Liau, A. K. (2013). The effects of positive interventions on happiness and depressive symptoms, with an examination of personality as a moderator. *Journal of Happiness Studies*, *14*, 591–612. doi:10.1007/s10902-012-9344-4

Sin, N. L., & Lyubomirsky, S. (2009). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: a practice-friendly meta-analysis. *Journal of Clinical Psychology*, *65*, 467–487. doi:10.1002/jclp.20593

Vaillant, G. E. (2000). Adaptive mental mechanisms: Their role in a positive psychology. *American Psychologist*, *55*, 89–98. doi:10.1037/0003-066X.55.1.89

Wadlinger, H. A., & Isaacowitz, D. M. (2011). Fixing our focus: Training attention to regulate emotion. *Personality and Social Psychology Review*, *15*(1), 75–102. doi:10.1177/1088868310365565

Wellenzohn, S., Proyer, R. T., & Ruch, W. (2015). *Who benefits from humor-based positive psychology interventions? The moderating effects of personality traits and the sense of humor*. Manuscript submitted for publication

Supplemental online material

Table A

Hierarchical Regression Analyses of Happiness and Depressive Symptoms at the Six-Months Follow-Up on Indicators of a Person × Intervention-Fit (Enter-Method), Controlled for Baseline Scores Based on the Multiple Imputation Data Set.

		Hierarchical Regression			
		Happiness after 6 months		Depressive Symptoms after 6 months	
Predictors	*df*	ΔR^2	*t*	ΔR^2	*t*
Step 1:	1, 816	.50 - .53		.12 - .17	
Pretest			27.69***		7.91***
Step 2: Predictors	7, 809	.08 - .09		.05 - .06	
Preference-Liking			0.79		0.35
Preference-Benefit			0.39		-1.19
Continuation			1.95†		-1.56†
Effort-Instruction			-0.65		0.43
Effort-Time			1.09		-0.92
Reactivity AHI			9.81***		-0.21
Reactivity CES-D			0.00		5.09***

Notes. $N = 816$. Liking: How much participants liked the exercise (1 = not at all, 7 = very much); Preference-Benefit: How much participants subjectively benefitted from the exercise (1 = not at all, 7 = very much); Continuation = Continued practicing up to one, three, or six months; Effort-Instruction: Did less than instructed (=0) or did as much or more than instructed (=1); Effort-Time: Total amount of time spent with the exercise during the intervention week; Reactivity AHI / CES-D: Differences between the posttest and the pretest in the Authentic Happiness Inventory and the Center for Epidemiological Studies Depression Scale, respectively.

†$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (one-tailed)

Part II:

Who Benefits from Humor-based Positive Psychology Interventions?

The Moderating Effects of Personality Traits and Sense of Humor

Sara Wellenzohn, René T. Proyer, & Willibald Ruch

This part is submitted for publication.

Abstract

The evidence for the effectiveness of humor-based positive psychology interventions (PPIs; i.e., interventions aimed at enhancing happiness and lowering depressive symptoms, is steadily increasing. However, little is known about who benefits most from them. We aim at narrowing this gap by examining whether personality traits and sense of humor moderate the long-term effects of humor-based interventions on happiness and depressive symptoms. We conducted two placebo-controlled online-intervention studies testing for moderation effects of basic personality traits (i.e., psychoticism, extraversion, and neuroticism) in a humor-based intervention (Study 1; N = 104), and moderation effects of the sense of humor (as conceptualized by McGhee, 1999) in five humor-based interventions (Study 2; N = 632). Happiness and depressive symptoms were assessed before and after the intervention, as well as after one, three, and six months. We found moderating effects only for extraversion (greater benefit for extraverts), while there were no effects for sense of humor. However, changes in sense of humor from pretest to the one-month follow-up predicted changes in happiness and depressive symptoms. Overall, moderating effects for personality (i.e., extraversion) were found. However, increases in sense of humor were associated with the interventions' effectiveness.

Keywords: happiness, humor, personality, positive psychology, positive psychology interventions

Introduction

Positive Psychology is the scientific study of what makes life most worth living (Seligman & Csikszentmihalyi, 2000). It aims at promoting psychological research and practice in areas such as morally positively valued traits (character strengths), positive emotions, and positive institutions and their contribution to well-being. Another core topic of positive psychology is the development of so-called positive psychology interventions (PPIs; i.e., "[…] treatment methods or intentional activities that aim to cultivate positive feelings, behaviors, or cognitions"; Sin & Lyubomirsky, 2009, p. 468). Recent meta-analyses by Sin and Lyubomirsky (2009) and Bolier et al. (2013) found support for the notion that they are effective in enhancing happiness and ameliorating depressive symptoms.

One specific variant of PPIs are interventions, which focus on humor. A few studies exist that support their effectiveness for enhancing well-being in the general population (e.g., Crawford & Caltabiano, 2011; Gander, Proyer, Ruch, & Wyss, 2013; McGhee, 2010b; Proyer, Gander, Wellenzohn, & Ruch, 2014; Wellenzohn, Proyer, & Ruch, 2016; for an overview see Ruch & McGhee, 2014), but also in clinical samples (e.g., Falkenberg, Buchkremer, Bartels, & Wild, 2011; Hirsch, Junglas, Konradt, & Jonitz, 2010; Konradt, Hirsch, Jonitz, & Junglas, 2013). It has been shown that humor induces amusement (Ruch, 2001, 2008, 2009), an important facet of positive emotions (the one that most frequently goes along with laughter; Platt, Hofmann, Ruch, & Proyer, 2013). Given that the elicitation of positive emotions is one of the proposed working mechanism of PPIs (Sin & Lyubomirsky, 2009), humor seems to be particularly well-suited for incorporation in PPIs.

While evidence for the effectiveness of positive psychology interventions is steadily growing, only little knowledge exists on whether (and how) certain personality traits moderate these effects. This is especially of interest from an applied perspective since the person × intervention fit (i.e., the degree to which an intervention matches an individual's preferences and personality) has been shown to be associated with an intervention's

effectiveness (Proyer, Wellenzohn, Gander, & Ruch, 2015; Schueller, 2010, 2012, 2014). We report two studies that are aimed at narrowing this gap in the literature by testing the impact of basic personality traits and sense of humor as defined by McGhee (1999, 2010a) as moderators in humor-based PPIs.

Humor-Based Positive Psychology Interventions

Seligman, Steen, Park, and Peterson (2005) published the first large scale online placebo-controlled positive psychology intervention study. They report findings for three self-administered online PPIs that are effective for up to six months in ameliorating depressive symptoms and enhancing happiness in comparison with a placebo control condition: The *gratitude visit*-(i.e., writing and delivering a gratitude letter to a person who has not been thanked so far), *three good things*- (i.e., writing down three good things that happened during the day), and *using signature strengths in a new way*-intervention (i.e., participants complete a character strengths inventory and receive feedback on their five highest strengths and the instruction to apply these strengths in a new way). An advantage of these online programs is that they are more cost effective than programs in group- or individual-settings as they are scalable (i.e., they can be easily distributed and made accessible to a large number of interested users) and can be self-administered using standardized written instructions; both are typically associated with low expenses for the researcher applying and supervising these programs in practice.

There are group-administered training programs for humor (McGhee, 2010b) that were found to be effective for enhancing emotional well-being, life satisfaction, positive mood, optimism, and lowering depression, or suicidal tendencies (e.g., Crawford and Caltabiano, 2011; Falkenberg et al., 2011; Hirsch et al., 2010; for an overview see McGhee, 2010). Thus, humor-based PPIs are expected to be well-received by its participants and enable a higher commitment to continue practicing and incorporating the activities into daily life.

There is also initial experience with humor-based online interventions. For example, Gander et al. (2013) adapted the *three good things*-intervention to a *three-funny things*-intervention by changing the instruction to include humor as its core component—instead of writing down three good things that happened to the person during the day, participants were asked to write down three *funny* things that happened to them during the day. The authors found the intervention to be effective in enhancing happiness for up to three months and ameliorating depressive symptoms up to six months after the intervention-week compared to a placebo control condition. Similar effects were recently found for a sample of people aged 50–79 years (Proyer, Gander, et al. 2014).

A third study by Wellenzohn et al. (2016) replicated the findings for the *three funny things*-intervention and adapted four other well-established PPIs into one-week humor-based PPIs (see Wellenzohn et al., 2016 for a more detailed description of the interventions); namely, (a) the *gratitude visit*- (Seligman, Steen, Park, & Peterson, 2005) was adapted into *collecting funny things*-intervention (i.e., remembering the funniest things ever experienced and writing them down in as much detail as possible); (b) the *counting kindness*- (Otake, Shimai, Tanaka-Matsumi, Otsui, & Fredrickson, 2006) into the *counting funny things*-intervention (i.e., counting all funny things that happen during the day and note the total number); (c) the *using your signature strengths in a new way*- (Seligman et al., 2005) into the *applying humor*-intervention (i.e., noticing the humorous experiences during the day and add humorous activities); and (d) the *one door closes and another door opens*- (Rashid & Anjum, 2008) into the *solving stressful situations in a humorous way*-intervention (i.e., thinking about a stressful experience and how it could have been solved in a humorous way). These newly adapted interventions (self-administered over one week) were then tested in an online-setting by comparing their long-term effectiveness with a placebo control condition (early childhood memories as in Seligman et al., 2005). As in earlier studies, the *three funny things*-intervention was effective in increasing well-being, but there were no effects for depression.

Furthermore, two out of the four newly adapted humor-based PPIs enhanced happiness (counting funny things- and applying humor-) and two were effective in ameliorating depressive symptoms (*applying humor*- and *solving stressful situations in a humorous way*-intervention) for up to six months. Hence, three out of the five tested interventions were effective in enhancing well-being and ameliorating depression and more research in this area seems warranted.

Who benefits most from a humor-based Positive Psychology Intervention?

Thus far, only few studies have directly examined the influence of individual difference variables in PPIs, and the findings are rather mixed. Senf and Liau (2013) showed that higher levels in extraversion and openness contribute to greater increases in happiness after a gratitude-based intervention. Greater extraversion was also associated with a stronger reduction in depressive symptoms following a gratitude- and a strengths-based intervention. Schueller (2012) also found that extraverted participants benefit more from a gratitude-intervention, as well as from a savoring-intervention. However, contrary to the findings by Senf and Liau (2013), Schueller found stronger benefits for introverts from a strengths-based-intervention. Furthermore, he also found introverts to benefit more from an *active-constructive responding*- and a *three good things*-intervention. Ng (2015) tested the role of neuroticism in a gratitude/kindness-intervention and found that participants with low levels in neuroticism demonstrated greater increases in happiness. Hence, several studies suggest that individual difference variables moderate the effectiveness of PPIs and encourage further research into the person × intervention fit. Thus far, no study has tested moderating effects of individual differences variables in humor-based interventions. Based on the existing literature, we expect humor-based PPIs to work better for those higher in extraversion. This hypothesis also receives support from correlational studies showing a positive relation between measures of humor and extraversion (e.g., Köhler & Ruch, 1996).

In addition to basic personality traits, *sense of humor* might be an especially important moderating variable for humor-based interventions. There are numerous conceptualizations of sense of humor (for an overview see Ruch, 2007, 2008). McGhee (1999) provides a multi-faceted model that is based on six hierarchically ordered humor-skills or -habits (i.e., enjoyment of humor, laughter, verbal humor, humor in everyday life, laughing at oneself and finding humor under stress). He argues that these humor-skills are malleable in order to increase ones sense of humor (McGhee, 2010ab). McGhee defines sense of humor as an ability to cope with stressful situations in daily life. He sees playfulness as its basis and argues that humor is a variant of play, namely the play with ideas. A playful attitude can be seen as a facilitating frame of mind for establishing humor and for successfully processing humorous stimuli along with positive mood. McGhee's (1999) framework seems best-suited for a further exploration in positive psychology intervention studies as he also developed a measure specifically for usage in intervention studies (i.e., the *Sense of Humor Scale;* McGhee, 2010a). We aim to test Wellenzohn et al.'s (2016) hypothesis on the moderating role of the sense of humor in humor-based PPIs and its potential in predicting long-term changes in happiness and depressive symptoms.

The present studies

Our main aim is to examine the moderating effects of personality and the sense of humor on the effectiveness of humor-based interventions in a set of two studies. In Study 1, we test basic personality traits (i.e., the superfactors of personality *psychoticism, extraversion, and neuroticism* in Eysenck's personality model; see e.g., Eysenck & Eysenck, 1985) as moderators for the *three funny things*-intervention (re-analyzing data from the study by Gander et al., 2013). Based on the existing literature, we expect humor-based PPIs to work better for people low in neuroticism and high in extraversion. In Study 2, we examine sense of humor as conceptualized by McGhee (2010a) as a moderator in the *three funny things*-intervention as well as in four further humor-based PPIs (re-analyzing data from the study by

Wellenzohn et al., 2016). Furthermore, we test (a) whether changes in sense of humor from pretest to the one-month follow-up can predict long-term changes in happiness and depressive symptoms, and (b) whether changes in sense of humor and its sub-components differ in their ability to predict changes in happiness and depressive symptoms. Both studies are placebo-controlled online intervention-studies with happiness and depressive symptoms assessed at pre- and posttest as well as at one, three, and six months follow-ups.

Those with a higher sense of humor (according to McGhee's conceptualization; McGhee, 2010a) are more often exposed to humorous situations and thus, might come up with funny things to write down more easily (the core of the three funny things-intervention), to remember (as in the collecting funny things-intervention), or also noticing funny things during the day more easily (as in the counting funny things-intervention). Moreover, those with high scores in sense of humor might also find it easier to come up with ideas on how and where to apply humor in a new way (as in the applying humor-intervention), or be more creative in solving stressful situations in a humorous way. Thus, we expect those with higher levels in sense of humor to benefit more from humor-based PPIs. Furthermore, as the sense of humor might be a trigger of positive emotions, we expect early changes in sense of humor and its sub-components to predict upward changes in happiness and amelioration of depression.

Study 1

Method

Participants

The total sample consisted of $N = 104$ women who completed all follow-up assignments in the *three funny things*-intervention ($n = 55$) or the placebo control condition ($n = 49$) in the study by Gander et al. (2013). Their mean age was 45.16 years (SD = 9.75), ranging from 19 to 79. The participants were generally well-educated, with 26.9% having a university degree, 17.3% having a degree from an applied university, 22.1% having a

certificate that would allow them to attend university, and 33.7% having completed vocational training.

Instruments

The *Eysenck Personality Questionnaire-Revised* (EPQ-R; Eysenck & Eysenck, 1985; German version by Ruch, 1999) consists of 102 items with a yes/no answer-format for the assessment of psychoticism (32 items, $\alpha = .63$), extraversion (23 items, $\alpha = .79$), and neuroticism (25 items, $\alpha = .84$), and additionally a lie scale (22 items, $\alpha = .74$) to cover social desirability.

The *Authentic Happiness Inventory* (AHI; Seligman et al., 2005) is a subjective measure for the assessment of overall happiness in the past week. Its reliability and validity, in the original as well as the German version, was supported by a broad range of studies (e.g., Proyer, Wellenzohn, et al., 2015; Ruch, Proyer, Harzer, Park, Peterson, & Seligman, 2010). Every item consists of five statements (e.g., from to "Most of the time I feel bored" to „Most of the time I feel fascinated by what I am doing"). In Study 1, a 33-item version was used and in Study 2 a newer, revised version with 24 items was used. Internal consistency at pretest in Study 1 was $\alpha = .91$.

The *Center for Epidemiologic Studies Depression Scale* (CES-D; Radloff, 1977; in the German Adaption by Hautzinger & Bailer, 1993) consists of 20-items with a four-point scale ranging from 0 (*Rarely or none of the time [Less than 1 day]*) to 3 (*Most or all of the time [5-7 days])* and measures the frequency of depressive symptoms in the past week (e.g., "My sleep was restless"). Internal consistency at pretest in Study 1 was $\alpha = .92$.

Procedure

The study was advertised as a strengths-training in leaflets, in newspapers and magazines. The participants registered on a website that was set up for the administration of the program and were randomly assigned to either the *three funny things*-intervention (i.e., writing down three funny things that happened during the day), or the placebo control

condition (i.e., writing about early childhood memories; see Seligman et al., 2005; Gander et al., 2013). All participants filled in the basic demographics and baseline-questionnaires (i.e., AHI, CES-D, and EPQ-R). They subsequently received instructions for the intervention and conducted the intervention for the following seven consecutive days. After the intervention-week, as well as one, three, and six months after the intervention, they logged on to the website and completed the AHI and the CES-D. Participants received an automatically generated feedback on their well-being scores over the course of six months at the end of the study.

Results

Preliminary Analysis

Descriptive statistics for the AHI ($M = 2.98$, $SD = 0.49$), the CES-D ($M = 15.56$, $SD = 10.73$) and the EPQ as well as correlations between the personality dimensions and the AHI and CES-D at pretest are presented in Table 1. The table shows the expected findings in the cross-sectional analysis. Extraversion was robustly positively correlated with happiness and negatively with depression, while neuroticism demonstrated a negative relation with happiness, but was positively associated with depression.

Table 1

Descriptive Statistics and Moderating Effects of Personality at Baseline on Happiness and Depressive Symptoms in the Three Funny Things Condition Compared to the Placebo Control-Condition.

			AHI	CES-D	Happiness			Depression		
	M	*SD*	*r*	*r*	*df*	*t*	*p*	*df*	*t*	*p*
Psychoticism	7.68	3.42	-.02	-.06	99	-0.74	.23	99	1.24	.11
Extraversion	11.96	4.46	.39***	-.20*	99	2.37	.01	99	-1.75	.04
Neuroticism	14.00	5.25	-.53***	.41***	99	-0.62	.27	99	0.17	.43
Lie-scale	8.36	3.81	-.05	.08	99	-0.03	.49	99	-0.24	.41

Note. $N = 104$. r = partial correlation with AHI / CES-D at pretest controlled for age. Happiness/Depression = Personality × condition interaction (0 = Placebo control condition, 1 = Three funny things-intervention) as predictor of the happiness/depression scores after the intervention (all follow-ups averaged), when controlling for pretest scores in happiness/depression and personality.

†$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (one-tailed)

Moderating Effects of Personality

In order to test potential moderating effects of the three personality dimensions (extraversion, neuroticism, and psychoticism), we computed hierarchical regression analyses. We analyzed interaction effects between each personality dimension and the group-condition on happiness (averaged over the four follow-ups), controlling for the baseline level in the AHI. The same analyses were conducted for depressive symptoms (see Table 1 for the interaction effects). Extraversion moderated the effectiveness of the intervention on happiness and also on depressive symptoms. Figures 1 and 2 show the direction of the interaction-effects of extraversion for happiness and depressive symptoms.

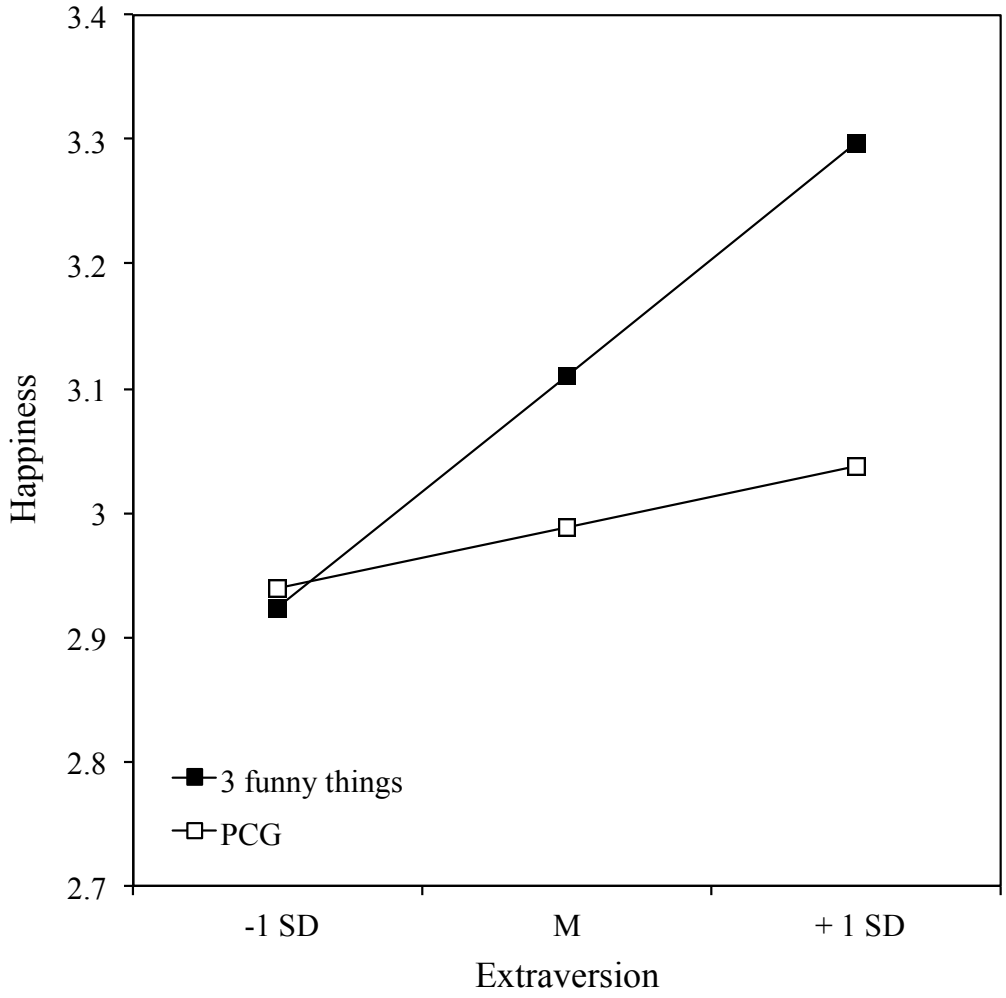


Figure 1. Happiness after the intervention (all time periods averaged, controlled for the pretest scores) for the three funny things condition and the placebo control condition (PCG) for different levels of extraversion.

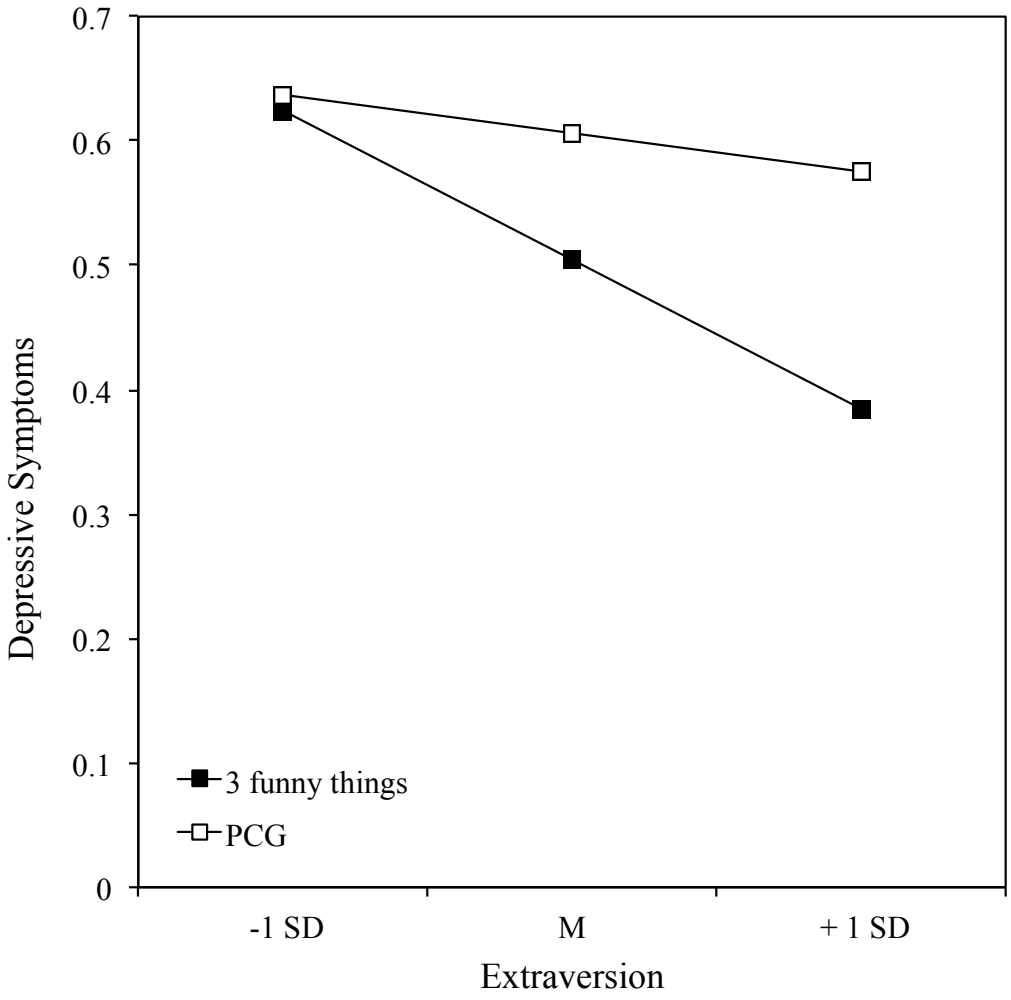


Figure 2. Depressive symptoms after the intervention (all time periods averaged, controlled for the pretest scores) for the three funny things condition and the placebo control condition (PCG) for different levels of extraversion.

Higher levels in extraversion went along with greater increases in happiness (Figure 1) and greater decreases in depressive symptoms (Figure 2) in the *three funny things*-intervention in comparison with the placebo control condition.

Discussion

This study provides first data on moderating effects of three basic personality traits on a humor-based positive psychology intervention, namely the *three funny things*-intervention. We found effects for one of the three Eysenckian superfactors. Those higher in extraversion demonstrated greater benefit from the intervention. We did not find effects for psychoticism

and neuroticism; also the tendency towards socially desirable answering behavior was found to be unrelated to the interventions' effectiveness. The findings for extraversion are in line with Senf and Liau's (2013) work, who found similar results for a signature strengths and gratitude intervention (see Seligman et al., 2005).

Similarly, Schueller (2012) found that delivering a gratitude letter in person also yielded greater benefits for those higher in extraversion. However, Schueller found some interventions (*active-constructive responding*, *signature strengths*-, and *three good things*-intervention) to be more effective for those higher on the introverted spectrum. One might argue that the *three funny things*-intervention (at least implicitly) also addresses social interaction situations—as funny things might be more likely to be experienced in the company of others. However, we do not know what exactly the participants in our study wrote down and experienced as being funny. It might be advisable to include variations of the standard instructions in future studies to make it easier for introverts to conduct the activity.

One limitation of Study 1 is, that the sample consisted solely of women. Thus, we do not know, if extraversion would also moderate the effectiveness of humor-based PPIs in men, or if other basic personality traits would play a role in a more diverse sample. While Study 1 has shown that extraversion plays a role for the effectiveness of a humor-based PPI, Study 2 examines the role of individual differences in the sense of humor as an additional moderator.

Study 2

Method

Participants

We used a sample of $N = 632$ adults (117 men and 515 women) who completed all follow-up measurements in the study by Wellenzohn et al. (2016). The participants' mean age was 47.38 ($SD = 11.55$) and they were rather well educated with 41.5% having a university degree, 19.1% having a degree from an applied university, 22.1% having a certificate that would allow them to attend university, and 3.5% having completed vocational training.

Instruments

As in Study 1, the AHI (α = .93) and the CES-D (α = .88) were used.

The *Sense of Humor Scale* (SHS: by McGhee, 2010a; used in the German version by Proyer, Ruch, and Müller, 2010) assesses *playfulness vs. serious attitude*, *positive vs. negative mood* and *sense of humor* with its six sub-facets (enjoyment of humor, laughter, verbal humor, humor in everyday life, laughing at yourself, and humor under stress), as well as a SHS Total Score for a more global assessment of sense of humor (see Müller & Ruch, 2011). The internal consistency at pre-test was α = .92 for the SHS Total Score, α = .71 for the playfulness dimension, α = .85 for the mood dimension, and α = .85 for sense of humor (for its sub-facets it ranged from α = .51 for the enjoyment of humor to α = .84 for the humor under stress sub-facet; median = .69). The SHS consists of 40 items (e.g., "I often find humor in things that happen at work") on a 7-point answer-scale.

Procedure

The procedure is comparable to Study 1 using the same recruitment strategy, but data were collected independently. Participants were randomly assigned to one of the five humor-based PPIs or the placebo control-condition (i.e., writing about early childhood experiences). Happiness and depressive symptoms were also assessed at pre- and posttest as well as at follow-up after one-, three- and six-months. Participants completed the SHS at pretest and at the one-month follow-up.

Results

Preliminary Analyses

Descriptive statistics and the relations between the SHS scales and the AHI and CES-D at pretest are presented in Table 2.

Table 2

Bivariate Correlations Between the AHI, the CES-D, and the Components of the Sense of Humor Scale Controlled for Age and Sex.

	M	*SD*	r_{AHI}	$r_{CES\text{-}D}$
AHI at pretest	3.16	0.48		
CES-D at pretest	10.28	5.70		
SHS tot	4.47	0.71	.51	-.38
Playful	4.86	0.80	.45	-.33
Mood	4.81	0.99	.69	-.56
SoH	4.23	0.80	.32	-.23
enjoy	3.79	0.98	.11	-.05
laughter	3.75	1.04	.31	-.24
verbal	3.99	1.05	.24	-.19
Eday	4.92	0.94	.33	-.25
YSelf	4.66	1.10	.22	-.15
Stress	4.28	1.21	.25	-.15

Note. N = 628. AHI = Authentic Happiness Inventory, CES-D = Satisfaction with Life Scale. SHS tot = total score in the Sense of Humor Scale; Playful = playful vs. serious attitude; Mood = positive vs. negative mood; SoH = sense of humor; Enjoy = enjoyment of humor; Verbal = verbal humor; Eday = humor in everyday life; YSelf = laughing at yourself; Stress = humor under stress. Corr. = correlation.

All correlations are significant at the 0.1%-level except for “enjoy humor” at 1% for the AHI and non-significant for the CES-D.

Table 2 shows that the means are in the expected range. Correlations with happiness and depressive symptoms were comparable with those reported by Proyer, Ruch, and Müller (2010) for personal well-being. The dependent variables were robustly negatively correlated at pretest (r = -.58, p < .01) without indicating redundancy.

Moderating Effects of Sense of Humor

To examine the moderating role of the sense of humor as measured with the SHS (McGhee, 2010a) on the effectiveness of humor-based PPIs, we computed the interaction-effects between the conditions (i.e., the humor-based PPIs vs. the placebo control condition) and the SHS Total Score on happiness and depressive symptoms, averaged over the four follow-ups, while controlling for pretest scores in happiness and depressive symptoms, and the SHS Total Score (Table 3).

Table 3

Moderating Effects of the Sense of Humor Total Score at Baseline on Happiness and Depressive Symptoms in Five Different Humor-Based Interventions Compared to the Placebo control-condition.

	n	Happiness			Depression		
		df	*t*	*p*	*df*	*t*	*p*
Three funny things	101	201	-0.70	.24	201	0.96	.17
Collecting funny things	105	205	-0.02	.49	205	0.32	.37
Counting funny things	108	208	0.11	.46	208	0.62	.27
Applying humor	104	204	-0.32	.37	204	-0.02	.49
Solving stressful situatio	109	209	-0.49	.31	209	1.40	.08

Note. Happiness/Depression = Sense of humor × condition interaction (0 = Placebo control condition, 1 = Humor-based intervention) as predictor of the happiness/depression scores after the intervention (all follow-ups averaged), when controlling for pretest scores in happiness/depression and sense of humor. Solving stressful situations = Solving stressful situations in a humorous way.

†$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (one-tailed)

Table 3 shows that none of the interaction-effects were significant. However, there was a trend for the *solving stressful situations in a humorous way*-intervention (for depressive symptoms). Figure 3 illustrates the direction of the trend.

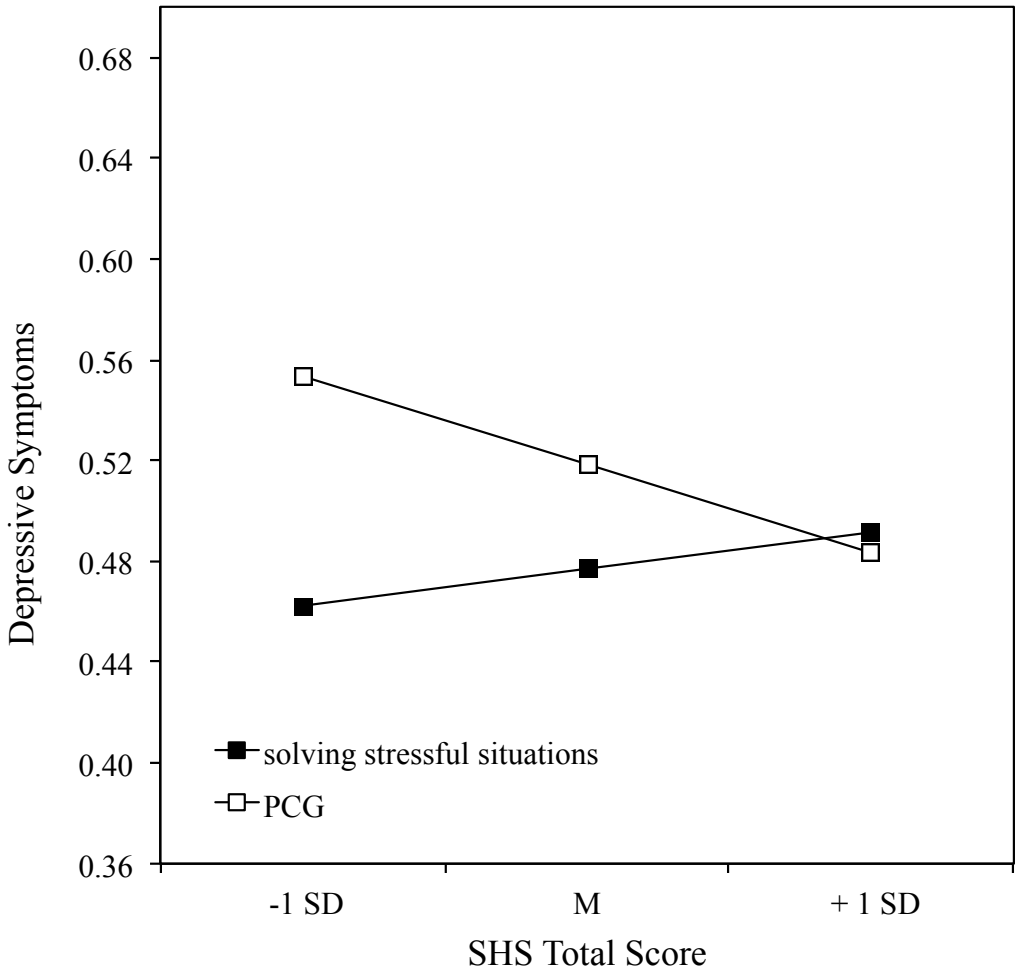


Figure 3. Depressive symptoms after the intervention (all time periods averaged, controlled for the pretest scores) for the solving stressful situations-condition and the placebo control condition (PCG) for different levels of the Sense of Humor Total Score.

Figure 3 shows that the *solving stressful situations in a humorous way*-intervention tended to be more effective for people low in SHS Total Score. These findings, however, should not be over-interpreted (especially, when considering the large number of analyses conducted), and are shown here only for descriptive purposes. While Table 3 shows the analyses for the total score of the SHS only, we also computed the respective analyses for the playfulness scale, the positive vs. negative mood scale, the sense of humor scale, and the six

humor skills. However, none of these analyses showed significant interaction effects (findings are not shown in detail, but are available upon request from the authors). In these analyses, the *t*-values for happiness ranged between 0.00 and 0.79 (median = 0.02) and between 0.02. and 1.40 (median = 0.15) for depression (all *n.s.*).

For a more in-depth analysis, initial changes in the SHS scales (changes from baseline to one month after completion of the intervention) were used for the prediction of changes in happiness and depressive symptoms (= criteria). Hierarchical regression analyses were conducted. In Step 1 age and sex were entered as predictors (yielding no incremental contribution in the prediction of happiness or depression; ≤ .01 %). In Step 2, the initial changes in the SHS scales (changes from pretest to the one-month follow-up) were entered as predictors of changes in happiness and depressive symptoms. The analyses were conducted for a total score of changes (i.e., an average score for the one-, three- and six-months follow-ups), but also separately for changes from the pretest to the one month follow-up, the three months follow-up, and the six months follow-up. The results for Step 2 are displayed in Table 4.

Table 4 shows that, as expected, early changes in humor predicted changes in happiness and in depressive symptoms at most of the time points. The multiple squared correlation coefficients for Step 2 for the averaged follow-ups ranged between .03 (enjoyment of humor) and .18 (total score of the SHS; median = .05) for happiness and between .00 (enjoyment of humor) and .11 (positive mood; median = .02) for depression. On average, these coefficients were larger for the one-month follow-up than for the later follow-ups, but the trends were more or less comparable in all cases.

Table 4

Hierarchical Regression Analyses (Step 2) of Initial Changes in Sense of Humor and its Components on Changes in Happiness and Depressive Symptoms in the Humor-Based PPIs Controlled for Age and Sex.

		Changes in all follow-ups		Changes after 1 month		Changes after 3 months		Changes after 6 months	
Initial changes		ΔF	ΔR^2	ΔF	ΔR^2	ΔF	ΔR^2	ΔF	ΔR^2
SHS tot	AHI	113.81***	.18	194.05***	.27	60.11***	.10	36.74***	.07
	CES-D	35.08**	.06	104.79***	.17	9.67**	.02	1.76	.00
Playful	AHI	41.73***	.07	53.27***	.09	27.54***	.05	16.59***	.03
	CES-D	7.13**	.01	22.02***	.04	2.64	.01	0.04	.00
Mood	AHI	116.31***	.18	243.69***	.32	55.46***	.10	31.31***	.07
	CES-D	66.52***	.11	211.03***	.30	21.05***	.04	2.77†	.01
SoH	AHI	57.56***	.10	86.57***	.14	32.15***	.06	21.52***	.04
	CES-D	13.07***	.02	36.74***	.07	2.64	.01	1.12	.00
Enjoy	AHI	18.54***	.03	23.97***	.04	10.75**	.02	8.58**	.02
	CES-D	1.40	.00	6.49*	.01	0.03	.00	0.22	.00
Laughter	AHI	24.33***	.04	39.58***	.07	13.15***	.02	8.44**	.02
	CES-D	6.01*	.01	19.53***	.04	1.49	.00	0.11	.00
Verbal	AHI	27.40***	.05	27.97***	.05	23.98***	.04	10.57**	.02
	CES-D	3.45†	.01	8.74**	.02	1.20	.00	0.17	.00
Eday	AHI	25.40***	.05	40.46***	.07	14.55***	.03	8.53**	.02
	CES-D	9.23**	.02	23.26***	.04	2.86†	.01	0.63	.00
YSelf	AHI	21.44***	.04	36.69***	.07	7.59**	.01	10.39**	.02
	CES-D	8.87**	.02	13.33***	.03	0.62	.00	5.97*	.01

(Table continues)

(Table Continued)

		Changes in all follow-ups		Changes after 1 month		Changes after 3 months		Changes after 6 months	
Initial changes		ΔF	ΔR^2	ΔF	ΔR^2	ΔF	ΔR^2	ΔF	ΔR^2
Stress	AHI	19.11***	.04	30.56***	.06	10.84**	.02	6.46*	.01
	CES-D	5.68*	.01	20.83***	.04	2.59	.01	.07	.00

Notes. $N = 527$. PPIs = positive psychology interventions. Initial changes = changes in sense of humor and its components from pretest to the one-month follow-up. SHS tot = total score in the Sense of Humor Scale; Playful = playful vs. serious attitude; Mood = positive vs. negative mood; SoH = sense of humor; Enjoy = enjoyment of humor; Verbal = verbal humor; Eday = humor in everyday life; YSelf = laughing at yourself; Stress = humor under stress. Changes in happiness = changes in happiness from pretest to the averaged follow-ups. Changes in depression = changes in depressive symptoms from pretest to the averaged follow-ups.
†$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed)

Discussion

Findings of the present study show that the sense of humor (as conceptualized by McGhee, 1999, 2010a) had *no* moderating effects on the effectiveness of five humor-based interventions. From a practical point of view this can be seen as "good news" since participants with varying levels of sense of humor (not only those with greater inclinations) seem to benefit from these interventions. Although there were some trends in the conducted analyses, they seem to be negligible from a practical point of view.

Although, McGhee's (2010a) *Sense of Humor Scale* is only one way of assessing sense of humor, one might argue that a measurement which is closer to the interventions and more sensitive for (upward) changes, would be able to detect moderating qualities of sense of humor; in this case we would argue similarly to what Seligman and colleagues (2005) have put forward when introducing the Authentic Happiness Inventory for the assessment of happiness in positive psychology intervention studies. However, our findings show that changes in sense of humor are associated with success in the interventions. The changes in

sense of humor from pretest to one month after the intervention predicted the changes in happiness and depressive symptoms for up to six months. Thus, sense of humor might be a working mechanism for humor-based PPIs. Additionally, other models have recently been put forward, which might also be used for developing interventions, and/or assessing the moderating role of humor-related variables (see Ruch, 2012).

One limitation of this study (as well as Study 1) is that the dependent variables and also the potential moderators were assessed via self-reports only. However, it would be helpful to have more objective indicators of these variables (e.g., including peer-ratings from knowledgeable others). Additionally, we did not have data available for sense of humor (in McGhee's conceptualization) and the basic personality traits simultaneously. Thus, the present findings warrant more investigations of potential moderators of humor-based PPIs, for example to examine their relative importance.

General Discussion

We found that extraversion moderates the effects of the *three funny things*-intervention. This is in line with earlier research (Schueller, 2012; Senf & Liau, 2013). Schueller (2012) varied the gratitude visit-intervention with different degrees of social interactions needed. He found that extraversion moderates the effectiveness of the more socially loaded versions of the interventions, but not for the version without any personal contact. If applying the same procedure to the *three funny things*-intervention, one might speculate that presenting ideas on situations or experience that provide humorous incidents without other people being present might make this intervention equally effective for extraverts and introverts. Hence, one aim for future application might be to develop interventions that are equally suitable for individuals with different levels of extraversion, or change the instructions in a way that all can work well with the included activities (e.g., introverts might find additional examples of observing humor in situations with people they know well rather than with strangers or persons that are less well-known to them, easier to

work with). When thinking of translating the findings into practice, one implication could be to better tailor interventions to the individuals such as assigning the *three funny things*-intervention to extraverts rather than to introverts.

As mentioned earlier, the effectiveness of humor-based interventions does not seem to depend on individual levels in sense of humor and, thus, seem equally suitable for people that see themselves as humorous or non-humorous (as well as playful vs. non-playful or in a positive vs. bad mood). However, one important finding of our analyses for practical purposes is that an increase in the sense of humor during a humor-based PPI predicts changes in happiness and depressive symptoms in the long-term. Keeping this in mind, it might be a good indicator of whether it is worth continuing an intervention with a client long-term, or if switching to a different set of activities might be a better idea (see also Proyer, Wellenzohn et al. 2015).

References

Bolier, L., Haverman, M., Westerhof, G., Riper, H., Smit, F., & Bohlmeijer, E. (2013). Positive psychology interventions: A meta-analysis of randomized controlled studies. BMC Public Health, 13, 119. doi:10.1186/1471-2458-13-119

Crawford, S. A., & Caltabiano, N. J. (2011). Promoting emotional well-being through the use of humour. *The Journal of Positive Psychology*, *6*, 237–252. doi:10.1080/17439760.2011.577087

Eysenck, H. J., & Eysenck, M. W. (1985). *Personality and individual differences: A natural science approach.* New York, NY: Plenum Press.

Falkenberg, I., Buchkremer, G., Bartels, M., & Wild, B. (2011). Implementation of a manual-based training of humor abilities in patients with depression: A pilot study. *Psychiatry Research*, *186*, 454–457. doi:10.1016/j.psychres.2010.10.009

Gander, F., Proyer, R. T., Ruch, W., & Wyss, T. (2013). Strength-based positive interventions: Further evidence for their potential in enhancing well-being and alleviating depression. *Journal of Happiness Studies*, *14*, 1241–1259. doi:10.1007/s10902-012-9380-0

Hautzinger, M., & Bailer, M. (1993). *Allgemeine Depressionsskala (ADS)* [General Depression Scale]. Göttingen, Germany: Hogrefe.

Hirsch, R. D., Junglas, K., Konradt, B., & Jonitz, M. F. (2010). Humortherapie bei alten Menschen mit einer Depression: Ergebnisse einer empirischen Untersuchung. Lebenszufriedenheit [Humor therapy in the depressed elderly. Results of an empirical study]. *Zeitschrift für Gerontologie und Geriatrie*, *43*, 42–52. doi:10.1007/s00391-

Köhler, G., & Ruch, W. (1996). Sources of variance in current sense of humor inventories: How much substance, how much method variance? *Humor - International Journal of Humor Research*, *9*, 363–398.

Konradt, B., Hirsch, R. D., Jonitz, M. F., & Junglas, K. (2013). Evaluation of a standardized humor group in a clinical setting: a feasibility study for older patients with depression: Humor therapy for older patients with depression. *International Journal of Geriatric Psychiatry*, *28*, 850–857. doi:10.1002/gps.3893

McGhee, P. E. (1999). *Health healing and amuse system: Humor as survival training* (3. ed.). Dubuque, IA: Kendall Hunt Pub Co.

McGhee, P. (2010a). *Humor as survival training for a stressed-out world: The 7 Humor Habits Program*. Bloomington, IN: AuthorHouse.

McGhee, P. (2010b). *Humor: The lighter path to resilience and health*. Bloomington, IN: AuthorHouse.

Müller, L., & Ruch, W. (2011). Humor and strengths of character. *The Journal of Positive Psychology*, *6*, 368–376. doi:10.1080/17439760.2011.592508

Ng, W. (2015). Use of positive interventions: Does neuroticism moderate the sustainability of their effects on happiness? *The Journal of Positive Psychology*. doi:10.1080/17439760.2015.1025419

Otake, K., Shimai, S., Tanaka-Matsumi, J., Otsui, K., & Fredrickson, B. L. (2006). Happy people become happier through kindness: A counting kindnesses intervention. *Journal of Happiness Studies*, *7*, 361–375. http://doi.org/10.1007/s10902-005-3650-z

Platt, T., Hofmann, J., Ruch, W., & Proyer, R. T. (2013). Duchenne display responses towards sixteen enjoyable emotions: Individual differences between no and fear of being laughed at. *Motivation and Emotion, 37,* 776-786.

Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2014). Positive psychology interventions in people aged 50-79 years: Long-term effects of placebo-controlled online interventions on well-being and depression. *Aging & Mental Health, 8*, 997-1005. doi:10.1080/13607863.2014.899978

Proyer, R. T., Ruch, W., & Müller, L. (2010). Sense of humor among the elderly: Findings using the German version of the SHS. *Zeitschrift Für Gerontologie Und Geriatrie*, *43*, 19–24.

Proyer, R. T., Wellenzohn, S., Gander, F., & Ruch, W. (2015). Toward a better understanding of what makes positive psychology interventions work: Predicting happiness and depression from the person × intervention fit in a follow-up after 3.5 years. *Applied Psychology: Health and Well-Being*, *7*, 108–128. doi:10.1111/aphw.12039

Radloff, L. S. (1977). The CES-D scale. A self-report depression scale for research in the general population. *Applied Psychological Measurement*, *1*, 385–401. doi:10.1177/014662167700100306

Rashid, T., & Anjum, A. (2008). Positive psychotherapy for young adults and children. In J. R. Z. Abela & B. L. Hankin (Eds.), *Handbook of depression in children and adolescents* (pp. 250–287). New York, NY: Guilford.

Ruch, W. (1999). Die revidierte Fassung des Eysenck Personality Questionnaire und die Konstruktion des deutschen EPQ-R bzw. EPQ-RK [The Eysenck Personality Questionnaire-Revised and the construction of German standard and short versions (EPQ-R and EPQ-RK)]. *Zeitschrift für Differentielle und Diagnostische Psychologie, 20,* 1–24. doi:10.1024//0170-1789.20.1.1

Ruch, W. (2001). *The perception of humor.* In A. W. Kaszniak (Ed.), Emotion, Qualia, and Consciousness (pp. 410–425). Tokyo, Japan: Word Scientific Publisher. doi:10.5167/uzh-77826

Ruch, W. (2007). *The sense of humor: Explorations of a personality characteristic* (2nd ed.). Berlin, Germany: Walter de Gruyter.

Ruch, W. (2008). Psychology of humor. In V. Raskin (Ed.), *The primer of humor research* (pp. 17–100). Berlin, Germany: Mouton de Gruyter.

Ruch, W. (2009). Amusement. In D. Sander & K. Scherer (Eds.), *The Oxford companion to the affective sciences* (pp. 27–28). New York, NY: Oxford University Press.

Ruch, W. (2012). Towards a new structural model of the sense of humor: Preliminary findings. In *AAI Symposium on Artificial Intelligence of Humor Proceedings* (pp. 2–4). Retrieved from http://www.aaai.org/ocs/index.php/FSS/FSS12/paper/viewFile/5652/5809

Ruch, W., & McGhee, P. (2014). Humor intervention programs. In A. C. Parks & S. M. Schueller (Eds.), *Handbook of Positive Psychological Interventions* (pp. 193–197). Oxford: Wiley-Blackwell.

Ruch, W., Proyer, R. T., Harzer, C., Park, N., Peterson, C., & Seligman, M. E. P. (2010). Values in Action Inventory of Strengths (VIA-IS): Adaptation and validation of the German version and the development of a peer-rating form. *Journal of Individual Differences*, *31*(3), 138–149. doi:10.1027/1614-0001/a000022

Schueller, S. M. (2010). Preferences for positive psychology exercises. *The Journal of Positive Psychology*, *5*, 192–203. http://doi.org/10.1080/17439761003790948

Schueller, S. M. (2012). Personality fit and positive interventions: Extraverted and introverted individuals benefit from different happiness increasing strategies. *Psychology, 3*, 1166–1173. doi:10.4236/psych.2012.312A172

Schueller, S. M. (2014). *Person–activity fit in positive psychological interventions.* In Parks, A. C., & Schueller, S. M. (Eds.), The Wiley Blackwell Handbook of Positive Psychological Interventions (pp. 385–402). John Wiley & Sons, Ltd. doi/10.1002/9781118315927.fmatter/summary

Seligman, M. E. P., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist*, *55*, 5–14. doi:10.1037/0003-066X.55.1.5

Seligman, M. E. P., Steen, T. A., Park, N., & Peterson, C. (2005). Positive psychology progress: Empirical validation of interventions. *American Psychologist*, *60*, 410–421. doi:10.1037/0003-066X.60.5.410

Senf, K., & Liau, A. (2013). The effects of positive interventions on happiness and depressive symptoms, with an examination of personality as a moderator. *Journal of Happiness Studies*, *14*, 591–612. doi:10.1007/s10902-012-9344-4

Sin, N. L., & Lyubomirsky, S. (2009). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice-friendly meta-analysis. *Journal of Clinical Psychology*, *65*, 467–487. doi:10.1002/jclp.20593

Wellenzohn, S., Proyer, R. T., & Ruch, W. (2016). Humor-based online positive psychology interventions: A randomized placebo-controlled long-term trial. *The Journal of Positive Psychology*, *11*(6), 584–594. doi:10.1080/17439760.2015.1137624

Part III:

How do Positive Psychology Interventions Work?

A Short-term Placebo-controlled Humor-based Study on the Role of the Time Focus

Sara Wellenzohn, René T. Proyer, & Willibald Ruch

Published as:

Wellenzohn, S., Proyer, R. T., & Ruch, W. (2016). How do positive psychology interventions work? A short-term placebo-controlled humor-based study on the role of the time focus. *Personality and Individual Differences*, *96*, 1–6. doi:10.1016/j.paid.2016.02.056

This is an Accepted Manuscript of an article published by Elsevier ScienceDirect in Personality and Individual Differences on 21/02/2016, available online: http://www.sciencedirect.com/science/article/pii/S0191886916301118

Abstract

The past years have seen a growing interest in the study of positive psychology interventions. Meta-analytic evidence suggests that they are effective in enhancing happiness and ameliorating depression. However, far less is known on why and how they work. We test two proposed working mechanisms: An attentional shift to the positive, and savoring positive emotions. The proposed mechanisms are tested by manipulating the time focus (past, present, or future) in the instruction of a one-week online humor-based positive intervention (*three funny things)*. A sample of 695 adults was randomly assigned to one of the intervention condition or a placebo control condition. All three variants were effective in enhancing happiness and ameliorating depressive symptoms from pre- to post-intervention compared to the placebo control condition. As expected, the present variant was associated with both mechanisms, while the past variant was more strongly associated with the savoring mechanism, and the future variant more strongly with the attentional shift mechanism. This initial study provides first support for the potential working mechanisms of effective positive interventions.

Keywords: attentional shift; depression; happiness; humor; intervention; positive psychology; positive psychology intervention; savoring

Introduction

Positive psychology aims at studying what makes life most worth living (Seligman & Csikszentmihalyi, 2000). One of its applied areas is the study of strategies, intentional activities, and, more broadly speaking, ways of how people can boost their well-being. Over the past years, a broad range of positive psychology interventions (PPIs) has been developed. They aim at inducing positive emotions, cognitions or behaviors. Two recent meta-analyses suggest that they are effective in enhancing well-being and ameliorating depression (Bolier et al., 2013; Sin & Lyubomirsky, 2009).

Only comparatively few studies exist, which specifically address *how* and *why* PPIs work. The model by Lyubomirsky and Layous (2013) refers to positive emotions, thoughts, behaviors and need satisfaction as mediators and the person×activity-fit as a moderator of the effectiveness (see e.g., Schueller, 2012; Senf & Liau, 2013). Thompson, and colleagues (2015) argue that this fit is higher if the intervention feels "natural" and if it is pursued because of intrinsic motivation. They found a greater person-activity fit for women than men in a psychology undergraduate's sample across several PPIs. Proyer and colleagues (2015) found that indicators of a person×activity-fit robustly predict well-being and depression 3.5 years after completion of a PPI. Mainly the indicator "early reactivity" contributed to the prediction and it seems as if this initial phase is of crucial importance (see also Wellenzohn et al., 2016). Therefore, this period might be best suited for observing working mechanisms.

Quoidbach, Mikolajczak, and Gross (2015) proposed a process model of emotion regulation as a framework for PPIs. They structure the variety of different PPIs using the emotion regulation-model by Gross (1998) and propose emotion regulation strategies as the theoretical background for possible working mechanisms. These are *situation selection*, *situation modification*, *attentional deployment*, *cognitive change and response modulation*. They conclude that the strongest evidence exists for interventions using attentional deployment, followed by cognitive change, and response modulation (being effective in the

short-term), while for situation selection and situation modification more research is needed. Furthermore, their model is structured by the time (before, during, or after the event) when the emotion regulation strategy is applied. The authors suggest that each proposed working mechanism (i.e., different emotion regulation strategies) can be used in all three periods, but its effectiveness varies depending on which strategy is used in which time frame. One might therefore argue that the focus of a PPI's instruction, aiming at the past, present, or future, is associated with different working mechanisms.

The time-perspective in positive psychology interventions and mechanisms

An inspection of the effectiveness of the nine tested PPIs in Gander et al.'s (2013) study and a review of comparable studies (e.g., Mongrain & Anselmo-Mathews, 2012; Proyer, Gander et al., 2014; Seligman, Steen, Park, & Peterson, 2005), seems to suggest that interventions addressing the *present* or the *future* in the instruction (e.g., writing about good or funny things, or one's usage of strengths in daily life) were generally more effective in enhancing happiness. As a trend, this also seems true for ameliorating depressive symptoms. Those focusing on past situations or events (e.g., *one door closes another one opens*; Otake et al., 2006) seem to be less effective in comparison. This notion receives further support from a recent placebo-controlled study on humor-based PPIs (Wellenzohn, Proyer, & Ruch, 2016). Interventions directed towards the past (e.g., collecting the funniest things that *ever* happened in ones life), were less effective than those focused on the present (e.g., noting three funny things that happened during the day, or counting funny things during the day). Hence, the hypothesis that the time perspective in the instruction of a PPI plays an important role in enhancing happiness and ameliorating depression by triggering specific working mechanisms is strengthened.

The field of *positive psychotherapy* provides a further perspective on potential working mechanisms. Seligman, Rashid, and Parks (2006) argue that conducting positive interventions could lead to a more positive attentional-focus. Sanchez and colleagues (2014)

investigated a related concept in their work on the *positive information-processing bias* and its relation to positive mood. Research in the latter area suggests that participants who underwent a positive mood induction showed a mood-congruent reaction (e.g.. spent more time looking at positive pictures the better their mood was). Hence, the positive mood induction triggered a shift in the participants' attention (i.e., a positive information-procession bias). Based on the existing literature, we hypothesize that PPIs are associated with a shift in the attention towards a more positive outlook, thereby, facilitating a positive information-processing bias. The attentional shift described in Quoidbach et al. (2015) could be seen as a cognitive change strategy, as it reflects how people perceive a given situation (e.g., appraising a situation as a special moment). Quoidbach et al. (2015) suggest that the effectiveness of the cognitive change strategy in increasing positive emotions in the short-term is strong in the present and future time focus, but modest for the past time focus (i.e., after the event). Therefore, we expect that PPIs focusing on the present and future might be especially effective by having more potential to influence the attention as a momentary construct, compared to interventions directed at the past.

At this point, it needs mentioning that in earlier studies those PPIs focusing on the *past* were also effective to a certain degree (e.g., Gander et al., 2013). Therefore, one might argue that other working mechanisms contribute to their effectiveness (e.g., re-experiencing perceived positive emotions). In line with Lyubomirsky and Layous (2013) and Cohn and colleagues (2009) we hypothesize that *savoring positive emotions* might also contribute to well-being, and furthermore function as the main trigger of increased well-being in interventions focusing on the past. Thus, in comparison with interventions focusing on the *present* and *future*, focusing on the *past* might induce more savoring of positive emotions at that very moment when one is consciously remembering the positive experience. This conscious remembering of the experience might induce positive emotions with a higher intensity than if positive emotions are savored in the very moment, due to the fact that one

might be more easily detracted and not consciously focusing on the emotion. Embedded in Quoidbach et al.'s model (2015), the savoring mechanism might be assigned to the situation selection strategies (e.g., looking at pictures from ones holiday trips), for which the evidence regarding its effectiveness in increasing positive emotions in short-term is rather weak. Overall, we expect that different working mechanisms are more likely to be triggered, depending on the time focus—the *savoring* mechanism by interventions focusing on the past and the *shift in attention* mechanism by interventions focusing on the future, while both mechanisms might be triggered by the present (i.e. the original version of the experimentally varied intervention of the study; see Figure 1).

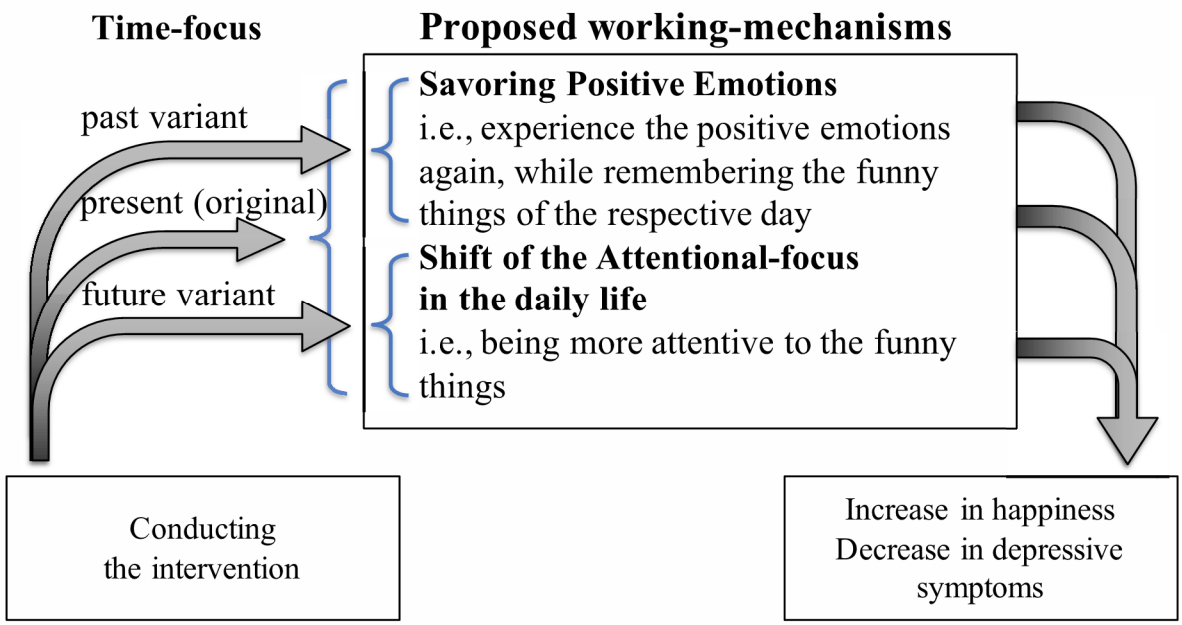


Figure 1. Scheme of the proposed mechanisms involved.

Aims of the present study and hypotheses

The aim of the present study is to experimentally vary the time-perspective in the instruction of one particular PPI, while the other parts of the instruction are not changed. This comparison allows for an initial estimation of the effects of this variation on the effectiveness of the interventions. Additionally, the proposed working mechanisms are assessed using a

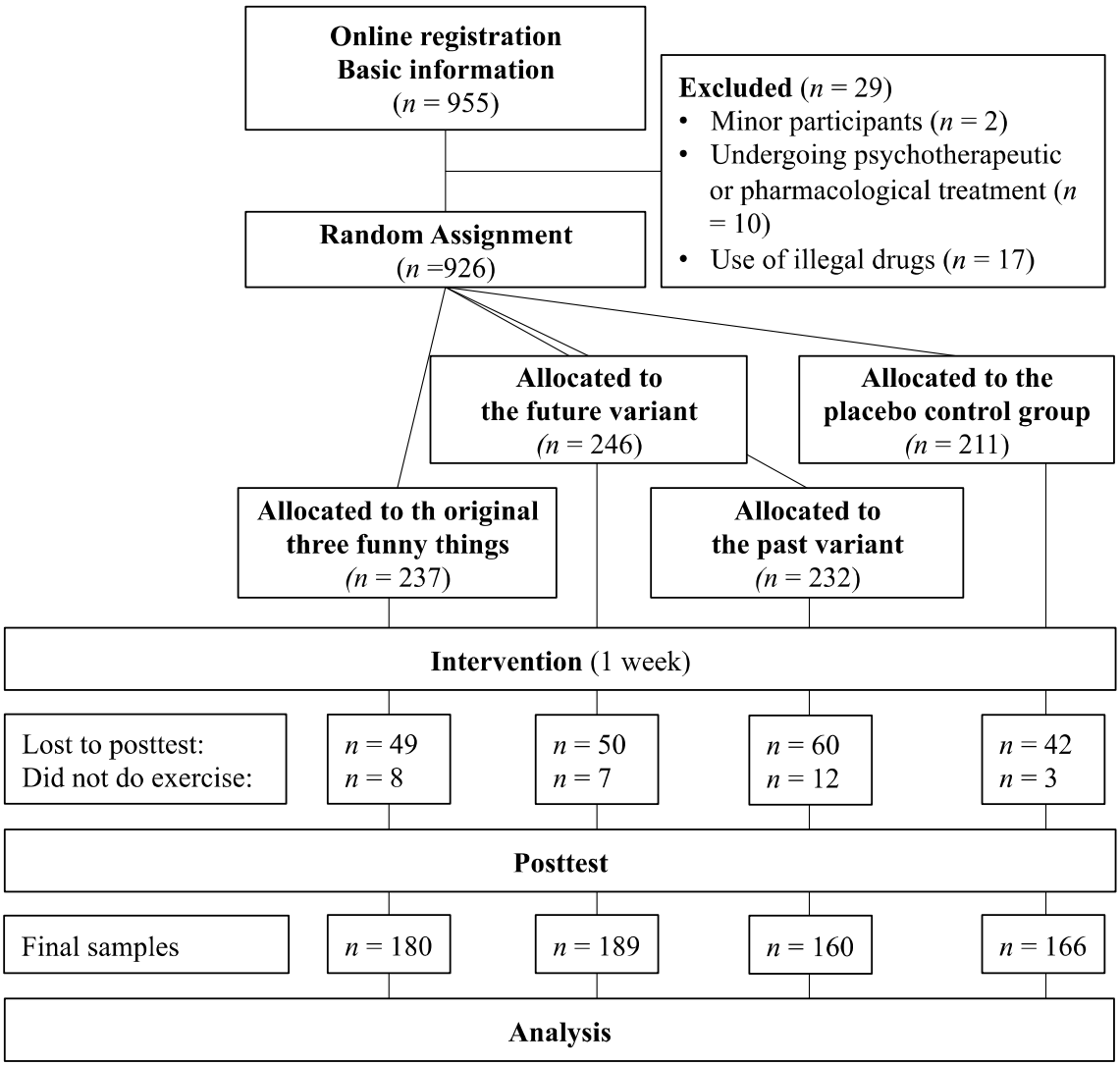
subjective rating. We use the *three funny things* intervention (Gander et al., 2013; Proyer, Gander et al., 2014; Wellenzohn et al., 2016) in its original version (i.e., *present* variant) as a starting point, and developed equivalent *past* and *future* variants.

We expect that all three variants are effective in enhancing well-being and ameliorating depressive symptoms after the intervention in comparison with a placebo control condition. Additionally, we expect the original intervention (focus on the present) to be associated with the numerically largest effects by triggering both proposed mechanisms. Furthermore, we expect participants in all three interventions to report a greater shift of attention to a positive focus compared to a placebo control condition (i.e., "early memories"; Seligman, et al., 2005). However, we expect differences among the three conditions: The *future* variant will likely elicit a stronger *shift* toward a positive focus compared to the past variant, while the *past* variant likely induces more re-experiences of positive emotions – *savoring* – compared to the future variant.

Method

Participants

A total of $N = 955$ adults registered on a research website and provided basic demographic information. Due to not meeting the inclusion criteria (i.e., older than 18 years, not undergoing psychotherapeutic or pharmacological treatment, and no use of illegal drugs, as proposed by the ethical committee) 29 were excluded (see Figure 2).



d

having completed public school and one person not having completed public school (i.e., nine years of obligatory school education).

Instruments

The *Authentic Happiness Inventory* (AHI; Seligman, Steen, Park, & Peterson, 2005; in the German version as used by Gander et al., 2013) assesses overall happiness in the past week. The AHI consists of 24 groups of five statements each (e.g., from 1 = "I have sorrow in my life" to 5 = "My life is filled with joy"). Internal consistency at pretest was $\alpha = .94$.

The *Center for Epidemiologic Studies Depression Scale* (CES-D; Radloff, 1977; in the German Adaption by Hautzinger & Bailer, 1993) measures the frequency of depressive symptoms in the past week (e.g., "My sleep was restless"). It consists of 20-items using a four-point answer-scale; 0 = "*Rarely or none of the time (Less than 1 day)*" to 3 = "*Most or all of the time (5-7 days)*"; $\alpha = .91$ (at pretest).

After the intervention week, participants were asked whether they had conducted the intervention (yes/no) and, if they had, whether they had done more or less or exactly as instructed. The possible mechanisms were assessed with single items; namely, (1) "Is it easier for you to perceive positive aspects/things in everyday life, due to the intervention?" (subjective changes in the *positive perception* in general); (2) "To which degree did you experience the positive emotions again while conducting the intervention?" (*savoring*); (3) "To which degree did your attention shift to funny things in everyday life, in the sense, that you were better able to perceive these?" (*shift* in the attentional focus); and (4) "What was more effected by the intervention: Savoring emotions or shifting the attention?" (for a comparison of *shift* vs. *savoring*). For item 4, a bipolar-scale with 9 answer options was used from "*savoring positive emotions +++"* over "*0*"*,* as the neutral midpoint, to "*shift of the attentional focus to the positive +++."* For item 1, 2, and 3, a 10-point answer scale was used from 0 (*not at all*) to 9 (*very strong)*. Furthermore, we computed a *difference score* by subtracting the scores in item 3 from item 2 to test what mechanism had been triggered to a higher degree (*relative score*). In this analysis, scores above the mid-point of the scale

indicate a relatively higher shift in the attentional focus and at the same time lower savoring of positive emotions—and vice versa for scores below the mid-point of the scale.

Experimental Conditions

We modified the "three funny things"-intervention (Gander et al., 2013; i.e., writing down three funny things that happened during the day every evening for about 10 to 15 minutes on seven consecutive days) in a way to focus on (a) the present (original version); (b) the past; or (c) the future (see Table A in the online supplemental material for the instructions). The humor-based PPI was chosen as it might be especially well-suited to trigger positive emotions as humor elicits amusement (Ruch, 2009). The activity is also useful for testing the proposed shift in the attention (towards humor; see e.g., McGhee, 2010). In short, all participants were asked to neutrally describe their activities of the particular day. In the *present* variant, participants were asked to write about three funny things they had experienced during the day. In the *past* variant, we asked them to think about the day exactly one week ago and describe what they had done on that day, and to note three funny things that had happened that day. In the *future* variant, we asked them to think about and write down their planned activities for the following day. The next day, they were asked to make a tally mark on a tally sheet for each funny thing as soon as it happened (no writing down of the funny things in the evening). The variants were developed to address the proposed working mechanisms (see Figure 1). For the placebo control condition, we used the well-tested *early memories exercise* by Seligman et al. (2005), where the participants had to write about their early childhood memories for about 10 to 15 minutes each evening on seven consecutive days.

Procedure

Participants registered for an online positive psychology intervention (hosted by an institution of higher education) by creating a personal password-secured account. They were randomly (by an automated algorithm, based on a Mersenne-Twister) assigned to one of the

three intervention conditions (past, present, or future), or the placebo control condition. Participants provided basic demographics and completed baseline questionnaires. They received the assigned intervention, which they conducted for seven consecutive days. After that week, the participants were invited to log-in to the homepage and to fill in the post-measures including the questions about what had changed.

Statistical Analyses

In order to test the effectiveness of the interventions, we compared each intervention condition against the placebo control condition using an ANCOVA with the pre-tests as covariate. To analyze the proposed differential influence of the modified time focus, we compared the subjective ratings for the proposed mechanisms for each condition using an ANOVA and subsequently conducted post hoc tests (LSD). All analyses were conducted for (a) the full sample, and (b) a subsample of those participants that indicated conducting the intervention according to the instruction, or doing more.

Results

Preliminary Analyses

Descriptive statistics of the AHI and CES-D at all measurement points are shown in Table B of the online supplementary material. The means numerically changed in the expected direction from pre- to posttest. Participants in the four conditions differed neither in their baseline level of happiness ($F(3, 691) = 0.34$, $p = 0.80$), nor in depressive symptoms, $F(3, 691) = 0.21$, $p = 0.89$. The dropouts were younger ($t(924) = 2.87$, $p < .01$, $d = 0.23$), and more likely men, $\chi^2(1, N = 926) = 3.25$ ($p < .01$), $d = 0.22$. Those dropping out earlier did not differ from the others in their baseline levels of happiness ($t(924) = 1.03$, $p = .30$), nor in depressive symptoms, $t(924) = 1.72$, $p = .09$.

The effectiveness of the interventions

As expected, all intervention conditions were effective in enhancing well-being and ameliorating depressive symptoms compared to the placebo control condition (see Table 1).

For happiness, the past variant was most effective (in terms of the effect sizes) followed by the present and the future variant. For depressive symptoms, the present variant yielded the numerically largest effects, followed by the past variant, and a trend for the future variant.

Table 1
ANCOVA for Happiness and Depression After the Intervention Controlled for the Pre-Test-Scores Compared to the Placebo Control Group.

		ANCOVA		
	N	*df*	*F*	η^2
Happiness				
Original (present)	180	1, 343	12.16***	.03
Future variant	189	1, 352	5.74**	.02
Past variant	160	1, 323	13.64***	.04
Depressive Symptoms				
Original (present)	180	1, 343	8.97**	.03
Future variant	189	1, 352	2.15†	.01
Past variant	160	1, 323	6.14**	.02

Note. Happiness = Authentic Happiness Inventory, Depressive Symptoms = Center for Epidemiologic Studies Depression Scale; η^2 = Partial eta squared.
†$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$; †$p < .10$ (one-tailed).

The comparison of the interventions led to mixed conclusions: As expected, the present variant yielded the largest effect for depressive symptoms, yet the past variant was slightly more effective for happiness.

Analyses on subjective ratings of proposed mechanisms

There were no group differences between the interventions in the full sample (see Table 2). The only exception was the subjective rating on the "positive perception." As expected, participants in the placebo control condition scored lower than those in the three intervention conditions. The numerical differences between the intervention conditions in the

other variables were mostly in the expected direction, but failed to reach statistical significance.

When analyzing the subsample, from which participants that did *less* than what was instructed were excluded, the pattern could be better interpreted. There were mean level differences of small to medium effect sizes in the expected direction. Again, the mean scores for *positive perception* were higher in those in the intervention conditions than in participants from the placebo control condition (medium to large effect sizes). Additionally, participants in the present variant demonstrated higher ratings in the positive perception than those in the past or future variants.

Savoring positive emotions was higher in the present compared to the future variant, but contrary to expectation, no difference between the past and the future variant was found. However, an inspection of the mean scores showed a trend in the hypothesized direction (numerically higher in the past than in the future variant). Additionally, ratings for *shifting* the attention to funny things were higher in those pursuing the present compared to the past variant. As with the savoring variable, no difference between the past and the future variants was found—yet the numerical differences were in the expected direction.

The analysis of the relative variables (i.e., shift vs. savoring and difference score) shows that participants in the future variant demonstrated higher scores than those in the past variant. This may be seen as initial support for the notion that the future variant is more associated with an attentional shift to the positive than the past variant, and that the past variant is more likely to enable savoring of positive emotions than the future variant. Additionally, we also found a small effect for the original (present) intervention in the direction of triggering a stronger shift in the attentional focus in comparison with the past variant.

Table 2

Means and Standard Deviations for the Ratings on the Proposed Mechanisms for the Full Sample and a Subsample of Participants Conducting the Activity as Instructed

	Present, original (1)		Future variant (2)		Past variant (3)		PCC (4)		ANOVA	Post hoc
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*df; F*	
Positive perception	5.33	2.12	5.11	2.29	5.19	2.22	3.40	2.33	3, 691; 27.64***	1, 2, 3 > 4***; *d* = 0.87, 0.74, 0.79
Savoring	5.21	2.01	4.78	2.09	5.01	2.28	–	–	2, 526; 1.93†	
Shift	5.63	2.10	5.31	2.28	5.34	2.20	–	–	2, 526; 1.21	
Difference Score	0.42	1.72	0.53	2.13	0.33	2.20	–	–	2, 526; 0.42	
Savoring vs. shift	5.84	2.11	5.98	2.17	5.78	2.18	–	–	2, 526; 0.41	
Subsample										
Positive perception	5.83	1.99	5.31	2.33	4.96	2.46	3.54	2.32	3, 308; 16.80***	1, 2, 3 > 4**; *d* = 1.05, 0.76, 0.60 1 > 3*; *d* = 0.40 1 > 2†; *d* = 0.24
Savoring	5.53	2.06	5.05	2.16	5.51	2.32	–	–	2, 209; 1.23	1 > 2†; *d* = 0.23
Shift	6.03	1.96	5.58	2.36	5.43	2.11	–	–	2, 209; 1.38	1 > 3†; *d* = 0.30
Difference Score	0.49	1.46	0.54	2.20	-0.08	2.19	–	–	2, 209; 1.80†	2 > 3*; *d* = 0.28 1 > 3†; *d* = 0.32
Savoring vs. shift	5.91	2.17	6.12	2.23	5.58	2.26	–	–	2, 209; 0.94	2 > 3†; *d* = 0.24

Note. Original (present) *n* = 180 (*n* = 75 in the subsample); Future variant *n* = 189 (*n* = 84 in the subsample); Past variant *n* = 160 (*n* = 53 in the subsample); PCC *n* = 166 (*n* = 100 in the subsample). Savoring = The degree to which one experienced the felt emotion again; Shift = To which degree the attentional focus shifted to funny things in daily life (i.e. noticing funny things easier); Difference Score = Difference score for the shift variable minus the savoring variable; Savoring vs. shift = What the activity caused more: Re-experiencing the emotions or shifting the attentional focus; Pos. perception = Positive perception. A dash = no data was assessed. *d* = Cohen's *d*. †$p < .10$; *$p < .05$; **$p < .01$; ***$p < .001$; †$p < .10$ (one-tailed)

Discussion

The aim of the present study was to investigate the impact of the time focus in a humor-based positive psychology intervention (PPIs) by varying its instruction towards different time-foci and testing associations with two possible working mechanisms (i.e., *attentional shift to the positive* and *savoring positive emotions*). Overall, in line with recent research on the *three funny things* intervention (Gander et al., 2013; Wellenzohn et al., 2016), the intervention was effective in enhancing happiness and ameliorating depressive symptoms. This was also true for its two variants that were developed for the present study (past and future). Moreover, the three interventions exceeded the placebo control condition in shifting the attentional focus to the positive. This supports the hypothesis, that the attentional shift might be a working mechanism of PPIs.

Furthermore, we hypothesized that the different time-foci trigger different working mechanisms (future variant = shift of focus towards positive cues; past variant = savoring of positive emotions). The findings were mixed. There were no differences (future vs. past) when the endorsement of each proposed mechanisms was assessed directly. However, in the relative variables, where participants needed to decide if the intervention triggered the attentional shift rather than the savoring of positive emotions or the other way round, we found differences between the two variants in the expected directions. Thus, the future variant contributed more to an attentional shift than the past variant and the past variant contributed more to savoring positive emotions than the future variant. Overall, findings from this initial study support the notion that different time-foci trigger different mechanisms.

The comparison with the original intervention (associated with both proposed mechanisms; see Figure 1) shows that it exceeded each of the other two variants (referring predominantly to just one of the two mechanisms) in triggering the mechanisms. Thus, the future variant was less effective in boosting savoring than the original, and the past variant was less effective in boosting the shift than the original. It needs mentioning, however, that

the interventions were still effective, even if one of the mechanisms was less prevalent. The expectation that the original intervention would be most effective in enhancing well-being (triggering both proposed mechanisms) was only partially met—for the amelioration of depressive symptoms, but for happiness the *past* variant showed a numerically slightly higher effect. However, more research will be needed to clearly differentiate among the mechanisms. Furthermore, there might be personality traits moderating the working mechanisms. As extraversion was found to be positively related to amusement (Köhler & Ruch, 1996), more extraverted people might benefit more from the past variant of the three funny things intervention as they might be better suited to remembering funny things or at least savor those memories with greater intensity. Schueller's (2012) study lends support to this notion as he found a savoring-intervention to be more effective for extraverts.

Limitations and Outlook

The way in which we manipulated the time focus in the instruction may be subject to change in future studies. For example, manipulations can be made by not only varying the *instruction*, but also by using different types of activities in the interventions, not just humor-based ones. Future studies could compare PPIs with other contents, as there might be some contents that are more suitable to either having a past, present or future focus. For example, forgiveness interventions might rather focus on the past, while mindfulness interventions might have a stronger focus on the present and optimism interventions a stronger focus on the future. Comparing interventions based on contents that inherently set different time foci, might lead to clearer differences and, thus, to greater effects. To analyze the working mechanisms in depth, one could construct interventions that have a stronger emphasis on the targeted mechanism. For example, comparing the effectiveness of an intervention that is very potent in inducing savoring of positive emotions with an intervention that is very potent in shifting the attentional focus, and then analyze if they differ in their effects on well-being.

Moreover, adherence to the instructions seems to influence the effects. If the intervention needs to be conducted in exactly the way in which it is instructed to detect differences in the triggered mechanisms, this could be a sign that the impact of the different time-foci on the mechanisms is rather sensitive. Future research should put a stronger emphasis on the adherence (e.g., assessing the writings of the participants during the intervention week). This would also give insights into the way participants conduct the interventions.

Additionally, it needs mentioning that we were not able to control for the perceived intensity of positive/funny experiences and the intensity of memory, nor the involvement in a specific experience, or the importance of length of time lag between actual experience and the memory retrieval (aside from what has been specified in the instructions). Future research is warranted to test whether any of the aforementioned variables has an effect on the findings reported here. Moreover, it would be interesting to use an open answer format in the future to inquire what participants feel is triggered by the activities. This would allow for testing whether participants are aware of the proposed working mechanisms (shift of the attentional focus to the positive and savoring). Finally, one might argue that the dependent variables used in this study only focus on present experiences and that they are suggestive and they also consist of only one item per mechanism. Therefore, measures such as the *Temporal Satisfaction with Life Scale* (Pavot, Diener, & Suh, 1998) might be used to also assess past and future life satisfaction in a more valid way and, additionally, more longitudinal designs will be helpful to cover for future experiences, as some working mechanisms might develop over time. For example, the attentional focus might be further shifted to the positive. For this, further measurement time points would be needed.

Overall, the present study supports the notion that the most effective way to boost happiness and ameliorate depressive symptoms might be to use an instruction focusing on the *present*. This is in line with Quoidbach et al. (2015) who also reported that there is the

strongest evidence for emotion regulation strategies that are applied during the event, thus, in the present. We would further assume that interventions focusing on the present activate more working mechanisms at once than those focusing on a past or future time perspective. Further research is needed to test if other PPIs (e.g., based on other dimensions of humor, see Ruch, 2012) or other contents (e.g., counting kindnesses; Otake et al., 2006) that focus on the present also target the two hypothesized mechanisms. Furthermore, one could also think of other mechanisms such as the situation modification or response modulation (Quoidbach et al., 2015). Thus, there is a need to experimentally vary possible working mechanisms to shed more light on *how* interventions work, and in the long-term, to contribute to an overarching model of working mechanisms for PPIs. Such a model would provide important trigger points that need to be studied in connection to moderating effects of personality. This, on the other hand will contribute to a better understanding of how interventions can be tailored to a person, and how and why different individuals achieve well-being in different ways.

References

Bolier, L., Haverman, M., Westerhof, G., Riper, H., Smit, F., & Bohlmeijer, E. (2013). Positive psychology interventions: A meta-analysis of randomized controlled studies. *BMC Public Health, 13,* 119. doi:10.1186/1471-2458-13-119

Cohn, M.A., Fredrickson, B.L., Brown, S.L., Mikels, J.A., & Conway, A.M. (2009). Happiness unpacked: Positive emotions increase life satisfaction by building resilience. *Emotion*, *9*, 361–368. doi:10.1037/a0015952

Gander, F., Proyer, R.T., Ruch, W., & Wyss, T. (2013). Strength-based positive interventions: Further evidence for their potential in enhancing well-being and alleviating depression. *Journal of Happiness Studies*, *14*, 1241–1259. doi:10.1007/s10902-012-9380-0

Gross, J.J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology*, *2*, 271–299. doi:10.1037/1089-2680.2.3.271

Hautzinger, M., & Bailer, M. (1993). *Allgemeine Depressionsskala (ADS)* [General Depression Scale]. Göttingen, Germany: Hogrefe.

Köhler, G., & Ruch, W. (1996). Sources of variance in current sense of humor inventories: How much substance, how much method variance? *Humor: International Journal of Humor Research*, *9*, 363–398.

Lyubomirsky, S., & Layous, K. (2013). How do simple positive activities increase well-being? *Current Directions in Psychological Science*, *22*, 57–62. doi:10.1177/0963721412469809

McGhee, P. E. (2010). *Humor: The lighter path to resilience and health.* Bloomington, IN: AuthorHouse.

Mongrain, M., & Anselmo-Matthews, T. (2012). Do positive psychology exercises work? A replication of Seligman et al. (2005). *Journal of Clinical Psychology*, *68*, 382–389. doi:10.1002/jclp.21839

Otake, K., Shimai, S., Tanaka-Matsumi, J., Otsui, K., & Fredrickson, B.L. (2006). Happy people become happier through kindness: A counting kindnesses intervention. *Journal of Happiness Studies*, *7*, 361–375. doi:10.1007/s10902-005-3650-z

Pavot, W., Diener, E., & Suh, E. (1998). The Temporal Satisfaction With Life Scale. *Journal of Personality Assessment*, *70*, 340–354. doi:10.1207/s15327752jpa7002_11

Proyer, R.T., Gander, F., Wellenzohn, S., & Ruch, W. (2014). Positive psychology interventions in people aged 50–79 years: Long-term effects of placebo-controlled online interventions on well-being and depression. *Aging & Mental Health*, *18*, 997–1005. doi:10.1080/13607863.2014.899978

Proyer, R.T., Wellenzohn, S., Gander, F., & Ruch, W. (2015). Toward a better understanding of what makes positive psychology interventions work: Predicting happiness and depression from the person × intervention fit in a follow-up after 3.5 years. *Applied Psychology: Health and Well-Being*, *7*, 108–128. doi:10.1111/aphw.12039

Quoidbach, J., Mikolajczak, M., & Gross, J.J. (2015). Positive interventions: An emotion regulation perspective. *Psychological Bulletin*, *141*, 655–693. doi:10.1037/a0038648

Radloff, L.S. (1977). The CES-D scale. A self-report depression scale for research in the general population. *Applied Psychological Measurement*, *1*, 385–401. doi:10.1177/014662167700100306

Ruch, W. (2009). Amusement. In D. Sander, & K. Scherer (Eds.), *The Oxford Companion to the Affective Sciences* (pp. 27-28). New York, NY: Oxford University Press.

Ruch, W. (2012). Towards a new structural model of the sense of humor: Preliminary findings. In *AAI Symposium on Artificial Intelligence of Humor Proceedings* (pp. 68-75). Palo Alto, CA: American Association for Artificial Intelligence.

Sanchez, A., Vazquez, C., Gomez, D., & Joormann, J. (2014). Gaze-fixation to happy faces predicts mood repair after a negative mood induction. *Emotion*, *14*, 85–94. doi:10.1037/a0034500

Schueller, S.M. (2012). Personality fit and positive interventions: Extraverted and introverted individuals benefit from different happiness increasing strategies. *Psychology, 3*, 1166–1173. doi:10.4236/psych.2012.312A172

Seligman, M.E.P., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist*, *55*, 5–14. doi:10.1037/0003-066X.55.1.5

Seligman, M.E.P., Rashid, T., & Parks, A.C. (2006). Positive psychotherapy. *American Psychologist*, *61*, 772–788. doi:10.1037/0003-066X.61.8.772

Seligman, M.E.P., Steen, T.A., Park, N., & Peterson, C. (2005). Positive psychology progress: Empirical validation of interventions. *American Psychologist*, *60*, 410–421. doi:10.1037/0003-066X.60.5.410

Senf, K., & Liau, A.K. (2013). The effects of positive interventions on happiness and depressive symptoms, with an examination of personality as a moderator. *Journal of Happiness Studies*, *14*, 591–612. doi:10.1007/s10902-012-9344-4

Sin, N.L., & Lyubomirsky, S. (2009). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice-friendly meta-analysis. *Journal of Clinical Psychology*, *65*, 467–487. doi:10.1002/jclp.20593

Thompson, R. B., Peura, C., & Gayton, W. F. (2015). Gender differences in the person-activity fit for positive psychology interventions. *Journal of Positive Psychology*, *10*, 179–183. doi:10.1080/17439760.2014.927908

Wellenzohn, S, Proyer, R.T., & Ruch, W. (2016). *Humor-based online positive psychology interventions: A randomized placebo-controlled long-term trial*. *Journal of Positive Psychology.* doi:10.1080/17439760.2015.1137624

Table A

Description of Intervention Variants (translated from German by the authors).

Intervention	Summary	Detailed instruction (paraphrased form the German instructions)
Original (present) Three funny things by Gander et al. (2013)	Every evening, participants had to describe the day in a neutral way, write down the three funniest things they had experienced and describe their feelings during each of these experiences.	For one week starting today, please take 15 minutes every evening before you go to bed to complete the following two parts of your exercise: 1. Think about what happened today and let the day pass before your inner eye. To support your memory, look at your day planner, your mobile phone and/or your computer. Describe today's events in a few keywords as neutrally and objectively as possible 2. Take time to note down the three funniest things you heard, saw, did or experienced today. Think about the things you found really funny today and describe how they made you feel.
Future variant Three funny things	Every evening, participants had to describe the following day in a neutral way. The following day, they had to make a note of every funny thing they experienced.	The exercise takes one week and consists of two parts: Part 1 has to be done in the evenings while part 2 helps you focus on the funny things that happen during your day. 1. Please take 15 minutes every evening before you go to bed: Think about what is going to happen the next day. To support your memory, look at your day planner, your mobile phone and/or your computer. Describe the following day's events in a few keywords as neutrally and objectively as possible 2. During the day, make a note of each funny thing that happens to you: Carry a list and a pen with you and make a note every time you hear, see, do, or experience something funny. In the evening, add up the total amount of funny things that happened during that day.
Past variant Three funny things	Every evening, participants had to describe the day exactly one week ago in a neutral way, write down the three funniest things they had experienced on that day of the previous week and describe their feelings during each of these experiences.	For one week starting today, please take 15 minutes every evening before you go to bed to complete the following two parts of your exercise: 1. Think back on the day exactly one week ago today. Think about what happened on that day and let it pass before your inner eye. To support your memory, look at your day planner, your mobile phone and/or your computer. Describe the events of that day in keywords as neutrally and objectively as possible 2. Take your time to note down the three funniest things you heard, saw, did, or experienced on that day the previous week. Think about the things you found really funny and describe how they made you feel.

Table B

Means and Standard Deviations of the Four Groups at the Pre and Post Intervention for Happiness and Depressive Symptoms.

		Pre		Post	
	N	*M*	*SD*	*M*	*SD*
Happiness					
Present (original)	180	3.02	0.60	3.14	0.57
Future variant	189	3.08	0.54	3.15	0.54
Past variant	160	3.06	0.57	3.18	0.57
PCC	166	3.07	0.58	3.07	0.60
Depressive Symptoms					
Present (original)	180	0.63	0.47	0.51	0.40
Future variant	189	0.64	0.44	0.57	0.42
Past variant	160	0.65	0.48	0.54	0.41
PCC	166	0.61	0.43	0.60	0.41

Note. Happiness = Authentic Happiness Inventory, Depressive Symptoms = Center for Epidemiologic Studies Depression Scale; PCC = Placebo control condition: Early memories.

General Discussion

In the three parts of the present thesis, online humor-based positive psychology interventions (PPIs) have been investigated intensively to answer several basic questions and to gain new insights on *whether, for whom*, and *how* these specific kinds of PPIs work. Generally, it can be concluded that new humor-based PPIs have been developed successfully, which also show long-term effects up to six months after the intervention, and therefore, the *whether*-question can be answered positively. This finding contributes to the existing literature in several ways.

First of all, so far only a few placebo-controlled studies exist that have not been conducted in a clinical setting (see Table 1 in the *General Introduction* and Ruch & McGhee, 2014, and Ruch, Rodden, & Proyer, 2011, for an overview). Existing studies have also only tested comparatively shorter time spans. This is true for PPIs in general since only 10 out of 39 interventions in the meta-analysis by Bolier et al. (2013) considered follow-ups after three months or more – and, of course, also for humor-based PPIs (with few exceptions; e.g., Gander et al., 2013). Finally, it has been shown that humor-based PPIs are not restricted to variants of Seligman et al.'s (2005) *three good things* intervention, since different types of activities were effective. Pawelski (2003) stated that among the goals of positive psychology is the demand for new positive psychology interventions. The present thesis successfully contributes to this goal by providing new PPIs that can be added to the toolbox of positive psychologists.

The findings in Part I also showed that not every humor-based PPI was effective in enhancing happiness and lowering depressive symptoms. For example, regarding effects in happiness, there was just a trend for the *collecting funny things*-activity that was modeled based on the gratitude intervention (Seligman et al., 2005). And regarding depressive symptoms, there was just a trend for the *counting funny things*-activity that was based on the counting kindness intervention (Otake et al., 2006). However, *applying humor*- and *solving*

stressful situations in a humorous way-activities were effective regarding both dependent variables, happiness and depressive symptoms. Furthermore, also the overall effectiveness of the *three funny things* intervention (Gander et al., 2013; Proyer et al., 2014) was replicated for happiness and for depressive symptoms. Thus, the question of *whether* humor-based interventions are effective can be answered positively.

Concerning the question *for whom* these interventions work best, basic personality traits were found to function as moderators. In detail, the three funny things intervention was more effective in extraverts. No moderating effects were found for the baseline level in sense of humor when assessed based on the scale by McGhee (2010b). Thus, the five tested humor-based interventions seem to work irrespective of the baseline levels in sense of humor. Also, the findings showed that early changes in sense of humor predict the long-term effectiveness. This may be important information for practitioners. Early changes in the expected direction may indicate a good person × intervention fit, and may suggest that the client will benefit from the intervention in the long-term. If no early changes in happiness are observed, assigning a different activity might be advisable.

Finally, to give an initial answer to the *how*-question, the experimentally varied time-focus (past, present, and future) of the three funny things intervention was found to trigger different working mechanisms of humor-based PPIs. Two candidate mechanisms were tested: the *savoring of positive emotion* (i.e., re-experiencing the positive emotions felt when the funny things happened) and the *attentional shift to the positive* (i.e., being more attentive to funny things). As expected, the first mechanism was relatively more strongly triggered by the past variant and the latter mechanism by the future variant. Thus, the time-focus influences how humor-based PPI work, and the results of these two potential working mechanisms provided first support for the notion that they represent two different mechanisms of how PPIs can work (i.e., enhancing happiness and lowering depressive symptoms).

The three main questions of the present thesis (i.e., *whether*, *for whom* and *how* humor-based PPIs work) are answered and discussed in more detail in the next section, followed by the limitations of the studies. Moreover, a more global elaboration on the contribution of the present thesis to the literature is provided, and its implications for future research and applications are demonstrated.

Overview of the Main Results and Conclusions

In the following sections, the findings of the studies included in the present thesis will be summarized and discussed structured along the lines of the overarching question of *whether*, *for whom,* and *how* humor-based PPIs work. Within each section, the results will be described, the research questions answered, and conclusions drawn.

Effectiveness of Humor-based Positive Psychology Interventions

First of all, the thesis aimed at testing *whether* humor-based PPIs can effectively be administered without an instructor (e.g., therapist or coach) and, instead, be self-administered over the Internet. As shown in the general introduction, there isn't much literature on humor-based PPIs, but the results of the interventions that were already tested are very promising (for an overview see Ruch & McGhee, 2014). Thus far, only one humor-based PPI has been tested and found to be applicable in a self-administered format via the Internet (Gander et al., 2013; Proyer et al., 2014). Therefore, further research and new humor-based interventions were needed.

To fill this gap, in Part I, well-established online PPIs merged with the knowledge on humor research to create new humor-based PPIs. A PPI was classified as well-established, when its effectiveness in enhancing happiness and ameliorating depression was shown in a placebo-controlled intervention study. Next, different aspects of humor were implemented by considering several theories in the field, such as McGhee's theory-driven approach (McGhee, 2010b), or Ruch's (2012) four-factor model of humor. Finally, and as one of the main contributions of Part I, the following four humor-based one-week PPIs focusing on different

aspects of humor were created (for an overview on their PPI-roots see Table 1 of part I): (1) collecting funny things (i.e., remembering the funniest things one has experienced in the past and writing it down), (2) counting funny things (i.e., counting all the funny experiences during the day and writing down the total amount in the evening), (3) applying humor (i.e., noticing humorous experiences during the day and adding new humorous activities), and (4) solving stressful situations in a humorous way (i.e., thinking about a stressful experience and how this has been, or could have been, solved in a humorous way).

The dropout rates can be used as an initial indicator of how the interventions were perceived. Findings show that the rates were comparable to other online PPIs studies, and therefore, it can be concluded that people seem to like the humor-based PPIs similarly. One might have expected the humor-based PPIs to be more popular than other PPIs since humor is among the most preferred dispositions (Müller & Ruch, 2012). It can be speculated that persons attracted to self-help online strengths trainings, such as the trainings that were advertised in the present study, might not be the persons who prefer this kind of content (i.e., focusing on and using humor). Parks, Della Porta, Pierce, Zilca, & Lyubomirsky (2012) found self-help happiness seekers to show midrange or over the clinical cut-off scores in depression. Thus, these people might not be the ones who come across funny situations very often, or at least do not have the capacity to notice these. Although the present study did not include participants who scored above the cut-off score for clinical depression, the humor-based PPIs might be preferred by participants lower in depression.

Furthermore, it was tested whether humor-based PPIs are effective in enhancing happiness and ameliorating depressive symptoms from pre-intervention to up to six months after the intervention. A total of $N = 623$ participants were randomly assigned to the interventions (or the placebo-control activity "early memories" by Seligman et al., 2005) in an online-setting. Besides testing the newly developed interventions, the study also aimed for replicating the findings for the more established three funny things intervention (Gander et al.,

2013; Proyer et al., 2014). The effects for happiness and depressive symptoms could be replicated, however, just a short-time effect for depressive symptoms was found, at the post-test. Also, the newly developed humor-based PPIs showed effects in happiness, and for lowering depressive symptoms. However, the effects on depressive symptoms were lower and shorter in duration than the ones for happiness. This unexpected lesser effects on depression could be explained by a floor-effect as only participants with depression scores under the cut-off indication depression were included in the present study. Since the new interventions were administered for the first time and it was unclear whether people with higher levels in depression might be overstrained with the tasks focusing on humor, depressed participants were excluded. However, several group interventions showed that humor interventions can be effective for patients suffering from depression (e.g., Hirsch et al., 2010; Rudnick, Kohn, Edwards, K. Podnar, Caird, & Martin, 2013). Moreover, Hirsch et al. (2010) found a humor therapy even more effective in a subgroup of medium to severe depressed. Thus, humor-based PPIs might also be as effective in ameliorating depressive symptoms if there is a minimum-level of depression, or also a sub-clinical level at first. Here, further investigation is needed on the influence of the level of depression at baseline. It is possible that humor-based interventions for people suffering from depression are less effective when they have to be administered by the participants themselves, and are much more effective when the participants are instructed and motivated by a therapist, or in group-settings. Thus, future studies should investigate the newly developed humor-based PPIs also with participants with higher levels of depression. A starting point might be to use the intervention in a face-to-face setting to be better able to monitor the reactions of the participant and to have more possibilities to guide them through the exercises.

On the other hand, the findings for happiness widely met the expectations. In addition to the replicated effects for the three funny things intervention, two of the four newly developed interventions were also effective in enhancing happiness for up to six months (i.e.,

the counting funny things-, and the applying humor-intervention). Thus, it can be concluded at this stage that humor-based PPIs can effectively be administrated over the Internet without any personal instructor to enhance happiness and lowering depressive symptoms. The interventions that were effective seem (a) to focus more on the *presence* (i.e., applying humor more often and counting the funny things during the day) while remembering the funniest things that ever happened focuses on the *past*; and (b) to focus more on *positive* things while solving stressful situations in a humorous way might too strongly raise the awareness of stressful situations. These observations set the ground for the hypotheses in part III.

It can be concluded that the *whether*-question can be answered positively. However, this conclusion needs to be drawn with caution as findings were mixed for the different types of interventions that have been tested. First of all, the effects were rather small, but nevertheless similar to other online PPIs (Mitchell et al., 2010). Secondly, the collecting funny things intervention did show just trends on happiness and the counting funny things intervention just trends on depressive symptoms. Thus, before the conclusion that humor-based PPIs are effective without constraints can be drawn, it needs to be investigated what the crucial component of a humor-based PPIs might be, in order to make it effective, or in other words, *how* humor-based PPIs could work. Knowing more about these potential mechanisms can help understand why the collecting funny things intervention did not work. The next sections further elaborate this aspect. Another important issue is the question of the contribution of this study to humor research. No formal definition was provided for the participants on what "humor" or a "funny" thing is. Therefore, it is possible that participants might also have noted or counted things that they found funny, which are of an aggressive or insulting nature. For example, one might argue that a katagelasticist (Ruch & Proyer, 2009b) or a bully will most likely notice different things than a gelotophobic person (Ruch & Proyer, 2008) or a victim of bullying—in the same way that introverts and extraverts seem to differ in the way they engage in these activities (see below; *Moderators of Humor-based Positive*

Psychology Interventions). Hence, a study focusing on more benevolent types of humor might be warranted. Such a study is currently being conducted (Ruch, 2015). It examines whether the interventions targeting the three components of Ruch's model on humor (Ruch, 2012) that are hypothesized to contribute most to well-being (i.e., benevolent humor, socially warm humor, and laughter) are effective in increasing happiness and ameliorating depression in comparison to a placebo control group. This study will be more strongly oriented on a comprehensive theory of humor and, thus, provide insight into which dimensions of humor can successfully be used to enhance well-being and moreover, whether any of the dimensions of humor could also have detrimental effects (e.g., it is unclear how an intervention targeted at being less cynical will be received).

Overall, one might argue that a stronger focus on different types of humor (Ruch, 2012, 2015) and the way people engage in humorous behaviors needs to be considered to a stronger degree in future studies. In fact, the recently published *Encyclopedia of Humor Studies* (Attardo, 2014) does *not* contain a separate entry on humor interventions, but only briefly mentions interventions in two entries (and only refers to work done in clinical settings). As a side-note, it should be mentioned that this is similar in the field of positive psychology (e.g., at the *International Conference on Positive Psychology* in Los Angeles in 2013, only six out of the over 700 contributions related to humor). As mentioned above, there are only a few studies on humor-based interventions (Ruch & McGhee, 2014), although one might argue that the rise in interest in positive psychology has also contributed to a stronger interest in the field and it seems as if the research interest is steadily growing over the past years. The present study contributes to the literature on humor research that come to the conclusion that humor possesses the ability to contribute to well-being – boosting happiness and ameliorating depressive symptoms – even when administered over the Internet. Moreover, humor also seems to contribute to happiness in the long-term. This supports the

literature on the positive relations between humor and several indicators of physical and psychological health, studied cross-sectionally.

These findings also have an impact on applied settings in the field of humor studies. Several associations exist that focus on the application of humor in practice (e.g., the *Association for Applied and Therapeutic Humor* [AATH], or *HumorCare*) and who could benefit from the translation of evidence-based findings for practical usage. The newly developed humor-based interventions could be implemented in other humor programs. Moreover, the present findings support the notion that also brief interventions with far less investment in terms of time or supervision in comparison to more complex programs like the one by McGhee (2010a) can already be beneficial.

Knowing that humor-based PPIs can be effective interventions, the question arises whether certain traits moderate the effects of humor-based PPIs and whether the person × intervention-fit plays a role. There is evidence from existing literature (e.g., Senf & Liau, 2013; Schueller, 2012) that personality plays a role in PPIs' effectiveness, but this has not been tested so far for humor-based PPIs. Thus, in the following section answers to the question *for whom* humor-based PPIs work best are given.

Moderators of Humor-based Positive Psychology Interventions

There are several possible ways to the answer to the question for *whom* humor-based PPIs work best. One way is to search for an individual difference variable that has predictive value for the effectiveness of a PPI, reflecting a good fit between the person and the intervention. Another way is to test indicators that are reflecting the result of a good person × intervention-fit. The latter approach was used by Proyer, Wellenzohn et al. (2015) who tested the predictive power of different indicators for the prediction of the long-term (3.5 years) effectiveness of PPIs, or more precisely, tested whether the way people work with PPIs has any predictive value. Proyer, Wellenzohn et al. (2015) investigated these indicators jointly for several different PPIs. Thus, although they included the three funny things intervention, no

conclusion could be drawn on this PPI. In the present thesis, however, the study in Part I allowed investigating these indicators of a person × intervention-fit in humor-based PPIs specifically. Thus, this investigation contributes to answering the question whether the same indicators are important in humor-based PPIs as the ones found to be important in PPIs in general. To the best of the authors knowledge there are no studies thus far testing moderating effects in humor-based PPIs.

Findings showed that also in humor-based interventions the *early changes* in happiness and depressive symptoms are the best predictors of long-term effects (i.e., six months) on happiness and depressive symptoms, respectively. Moreover, *preference* and *continuation* also predicted the long-term effectiveness of humor-based PPIs. It can be concluded that, when the intervention is conducted and no changes are observed at an early stage, one can use this indicator to allocate participants to other interventions that might be more suitable for obtaining greater effects, compared to staying with an intervention that does not fit the person. However, a next step in research would be to investigate possible cut-offs, for example, which level of preference is needed in order for it to be worth continuing with the intervention, or, also, how great a change is needed during one week of conducting an intervention. Furthermore, these levels might vary depending on the specific types of PPIs as some interventions with higher difficulty might need more time to show an effect, like suggested for the shift to funny things by McGhee (2010b).

In Part II of the thesis, the question *for whom* humor-based PPIs work best was also investigated, but using a different approach; namely testing individual difference variables (i.e., their moderating effects). Two studies were conducted, one testing the moderating effects of the three Eysenckian super factors (extraversion, neuroticism, and psychoticism) and the other one testing the role of sense of humor in humor-based PPIs. For the latter, McGhee's (2010b) conceptualization was used. This was chosen as the scale, based on this conceptualization, was developed in relation to an intervention program (the steps of

McGhee's humor intervention are reflected by the different subscales). Thus, it was expected to cover important areas of sense of humor in terms of interventions.

To sum up the results of the study on sense of humor, the interventions seem to work irrespective of the level in sense of humor at the beginning of the intervention. Based on the literature on the person × intervention-fit, we expected persons with a higher in sense of humor to benefit more from the humor-based PPIs. Moreover, McGhee (2010b) stated that humor interventions should be administered starting with an easier activity. For example, getting used to surrounding oneself with humor and then trying more difficult ones until one is able to try the most difficult application, the use of humor in stressful situations. Based on this idea, one might expect that some of the humor-based PPIs used in the present study, like solving stressful situations in a humorous way, might work better for participants entering the study with an already elevated level of sense of humor. However, the study in Part II of the present thesis does not support this notion. One explanation might be that the scale used to assess sense of humor is too strongly related to happiness (i.e., the depending variable; Müller & Ruch, 2011) and therefore the ceiling-effect came into play more strongly than it would have done with other conceptualizations of sense of humor: The persons starting off with a higher sense of humor are also already high in happiness. Thus, less improvement can be expected, compared to a person starting low in happiness. Thus, future studies might assess the sense of humor with other instruments based on a conceptualization less related to happiness. There are other models (e.g., Ruch, 2012) and measures (e.g., state-trait cheerfulness inventory), which might be more suitable to detect moderating effects. In line with McGhee's (2010b) assumptions on the role of difficulty, one might expect that humor-based interventions with low difficulty are effective for people low in trait cheerfulness, as they can implement a so far less used strategy to elicit positive emotions. On the other hand, people high in cheerfulness might benefit more from humor-based PPIs with advanced difficulty since such an intervention still might show them a new way to elicit positive

emotions. This is also in line with the "using signature strengths in a new way"-approach, i.e., building upon something that is typical for a person (matching the person's personality).

However, the finding of the present study that the level in sense of humor is independent of the effectiveness of a humor-based PPI corresponds with the result that working on one's top character strengths seems to be equally effective as working on ones lesser character strengths (Proyer, Gander et al., 2015). One could draw the conclusion, that, as long as one is working on positive traits, the level on which one starts off does not seem to matter. However, working on something that matches ones personality might be more fun and therefore lead to a better adherence.

Further analyses show that individual differences in the sense of humor still played a role. Changes in sense of humor during the intervention week – from pre to post intervention – predicted long-term changes in happiness. Thus, sense of humor might be one of the mechanisms that lead to increases in happiness and decreases in depressive symptoms. This could be explained by the broaden-and-build-theory by Fredrickson (1998). An increase in sense of humor might be induced by an increase of positive emotions. Thus, assessing positive emotions along with sense of humor when conducting a humor-based PPI might give more insights on this.

In the second study in Part II basic personality traits were tested for moderating effects in the three funny things intervention. Extraversion, was found to moderate the effectiveness while psychoticism nor neuroticism did not. Participants with higher levels in extraversion showed a larger increase in happiness and decrease in depressive symptoms, compared to the placebo control group. Similar findings have been reported for a gratitude- and a strengths-intervention by Senf and Liau (2012), where higher levels in extraversion were also found to be beneficial. The result of the present study fits the nature of the three funny things intervention, as it asks participants to experience funny things, and extraverted persons are

more likely to do funny things themselves or to come across situations where funny things might happen (e.g., in social situations like parties).

It needs to be mentioned that the results of the present study are based on the relative levels of extraversion. Thus it is unclear, if the more extraverted participants in the study are really extraverts. Future studies might observe extraverts and introverts in how they use the three funny things intervention. This might also lead to insights on how the intervention could be adapted to be more suitable for people lower in extraversion (e.g., observing funny things in movies).

Unfortunately, no data on basic personality dimensions was available for the newly developed humor-based PPIs, only for the three funny things intervention. For future studies, it would be interesting to investigate, whether higher levels in extraversion are also beneficial for other humor-based interventions. Schueller (2012) found that some interventions focusing on gratitude are more suitable for extraverted persons (i.e., gratitude visit intervention) with others more suitable for introverted persons (i.e., the three good things intervention), depending on the intervention strategy used. Thus, there might also be humor-based PPI-strategies that are more beneficial for extraverted and others that are more beneficial for introverted persons. The applying humor intervention might also be a humor-based PPI that uses a strategy that is better fitted to extraverted persons, but the counting funny things intervention with an instruction focusing on observing funny things (in contrast to doing funny things) might also be a good fit for introverted persons (like the three good things intervention by Schueller, 2012). These hypotheses could be tested in future studies.

However, for the solving of stressful situations in a humorous way, other traits might be more crucial, such as low levels in neuroticism and higher levels in openness. Having said that, it might be interesting to test further strengths for possible moderating effects. Curiosity or creativity, for example, might be advantageous for humor-based PPIs. On the other hand, there might also be certain dispositions that could be detrimental for the suitability of humor-

based PPIs, such as high scores in gelotophobia (i.e., the fear of being laughed at). If gelotophobes need to focus on the funny things that happened during the day, here is a high probability that these experiences will be associated with negative emotions, rather than with positive ones. Thus, a coach administering humor-based PPIs, would need to consider that there are people that are sensitive to the topic of humor – as it is closely related to laughter – and therefore, other PPIs focusing on other strengths might be more suitable (Proyer, Wellenzohn, & Ruch, 2014).

Mechanisms Triggered by Humor-based Positive Psychology Interventions

At first glance, these brief humor-based intervention studies, might seem too good to be true: Becoming happier while investing relatively little effort. However, a look at their effect sizes, might reduce the notion of a great cure. However, humor-based PPIs do work, thus, there must be cause for this. Knowing this cause might help design PPIs with greater effectiveness. Thus, it is of great interest to go a step further in the analysis of humor-based PPIs and to find out how they work. To contribute to this very basic and important question in intervention research, possible mechanisms of humor-based PPIs were examined and self-reports on what is really triggered in these interventions were collected. Thus, part III of the thesis goes one step further than the previous two parts, by experimentally testing two hypothesized mechanisms.

A very recent study by Quoidbach et al. (2015) provides a theoretical model of PPIs with ideas on possible mechanisms. Based on this framework and on findings from Part I and the observation of the varying levels of effectiveness found for different PPIs in other studies (e.g., Gander et al., 2013 or Seligman et al., 2005), it was hypothesized that different mechanisms are triggered depending on the time-focus of an intervention. More precisely, future-focused interventions were expected to trigger a shift of the attention to positive things and the past-focused intervention to trigger the savoring of positive emotions.

To experimentally test this hypothesis, a past- and a future-variant were constructed based on the three funny things intervention (see Table A in part III for detailed instructions), and their effectiveness compared to a placebo control condition (i.e., early memories) was tested. All three interventions were found to be effective and to boost the attention to positive things compared to the placebo activity. These findings therefore support the hypotheses. The original version was found to trigger both mechanisms, while the future variant was found to trigger the attentional shift mechanism more than the past variant. The past variant, on the other hand, triggered the savoring mechanism more compared to the future variant

Eventually, initial support was found for the notion that the past-variant triggers savoring positive emotions and the future variant shifts the attentional focus to positive things. Thus, it can be concluded that, depending on the time-focus, humor-based PPIs seem to trigger different working mechanisms. This fits the assumptions by Quoidbach and colleagues (2015) that different emotion regulation strategies might differ in their effectiveness depending on when the intervention is conducted (i.e., before, after, or during an event).

The results of the present study allow drawing conclusions for one specific humor-based PPI. It would be desirable to know, whether the proposed mechanisms are also applicable to other humor-based PPIs and moreover, to PPIs with other contents. For example, one could take the three good things intervention and vary the time-focus in the same manner like it was done for the three funny things intervention. The counting kindnesses intervention (Otake et al., 2006) could also be varied with the past variant condition counting the kind things participants have done in the past and the future variant condition counting the things that they expect to happen the following day. Thus, future studies might shed light on the influence of the time-focus in PPIs in general.

Coming back to another open questions that arose from the results in part I: Why did the collecting funny things intervention not show any effects? The focus of this intervention is clearly located in the past. Thus, one might argue, that the intervention triggers savoring of

positive emotions. However, triggering this mechanism should lead to an increase in happiness—the findings of this study do not support this notion. Thus, interventions might vary additionally in how effective they are in eliciting savoring of positive emotions. The positive emotions activated by thinking about humorous situations might mainly be amusement (Ruch, 2001, 2009). Amusement is defined as a facet of the positive emotions of joy (Ekman, 2003) and was found to be more easily elicited in people higher in trait cheerfulness (Hofmann, Platt, Ruch, Niewiadomski, & Urbain, 2015). However, there are other emotions that might be more suitable for savoring, for example, the positive emotion contentment (Fredrickson, 2008). This leads to the hypothesis that a PPI with another content might be more effective in triggering the savoring mechanism, like the three good things intervention (Seligman et al., 2005; see also Gander et al., 2013), or a beauty intervention (e.g., Diessner, Rust, Solom, Frost, & Parsons, 2006; Martínez-Martí, Avia, & Hernández-Lloreda, 2014; Proyer, Gander, Wellenzohn, & Ruch, 2015b).

Finally, knowing about possible working mechanisms of humor-based PPIs, future studies might try to boost the mechanism they are aiming for. For example, if one tries to shift the attentional focus to the positive, on might give a tasks that needs a lot of attention, like writing down the three best things that happened during the day. Thus, applicants would need to be constantly aware of good things and then choose the best ones among them. This might boost the attentional shift to positive things even more. Developing PPIs with a model on working mechanisms in mind might enable constructing the intervention more precisely to affect the desired mechanism. Besides contributing to the strong need for a theory on how PPIs work, this would eventually lead to even more effective interventions, which, in turn, would strengthen the position of PPIs in research but also in the practical field.

Limitations and Outlook

The studies included in the thesis are, to some extent, of exploratory nature and test new interventions as well as new mechanisms. Thus, there are several limitations that can be

addressed in future studies. For example, for part I, the selection of the established PPIs that were adapted to humor-based interventions was thoroughly made by trying to keep the diversity of the activities as broad as possible. However, other PPIs might also constitute useful bases to be adapted to a humor-framework. One could also imagine a theory-driven constellation of the interventions. For example, one could think of taking a model of humor, like the one introduced by Ruch (2012), and try to train the different dimensions that are included in the model. This could give more insight on which components of humor boost happiness, as well as which emotions are triggered by which components. Hereby, one could also consider the person × intervention-fit, namely, one can hypothesize, that people react differently to the elicitation of different positive emotions. One can speculate, that for example extraverted persons might be more attracted by active positive emotions and introverted more by passive positive emotions.

Thus far, it is known, that certain indicators of a person × intervention-fit predict long-term changes in PPIs and also in humor-based PPIs. However, it is unknown, whether assigning a person who is not showing early changes in happiness and depressive symptoms to another intervention would lead to greater effects, or whether it is just the person, who is not responsive to PPIs in general. Thus, future studies need to investigate whether relocating individuals to other interventions, if they do not show an early reactivity, would boost the effectiveness; of course, this would lead to a rather complex study design, and moreover, one would need to define a cut-off value in regards to at which point it would make sense to switch the intervention. Moreover, having a program consisting of several interventions would increase the probability of having interventions that fit the person. That way every participant could pick, what suits them best, in line with Schueller's (2010) line of research. Finally, a better person × intervention-fit enhances the effectiveness of the intervention program.

A further question that arises from the points discussed in the last paragraph is, how the different interventions can be optimally combined, for example, how to structure a program. Up until now, it is unclear, whether it is advantageous to order interventions according to their level of difficulty, in the same manner as McGhee's program, starting with easier tasks, getting comfortable with humor in everyday life and then trying the more difficult ones. According to him "[…] only then does the focus shift to using humor to cope with stress." (McGhee, 2010b; p. 123) which would boost the intervention's long-term effectiveness.

However, this hypothesized shift in the focus in humor-based PPIs has been tested for the first time in the present thesis. And indeed, humor-based PPIs (i.e., the three funny things intervention in the original and the future version) were able to trigger a focus on funny things. Overall, the variants with the three different time-foci were found to trigger the hypothesized mechanisms. However, it is up to future research to find out, whether there were other triggers than the different time-foci responsible for boosting the mechanisms. Thus, besides testing the influence of the time-focus in other PPIs, future research should also consider other possible triggers. For example, varying the kind of activity that is used, i.e. writing-, vs. behaving-, vs. thinking-task, to test their influence on boosting different mechanisms.

Additionally, other working mechanisms could be relevant, such as the modification of a situation, which could also explain effects on well-being (Quoidbach et al., 2015). This possible mechanism could be triggered by a PPI like the signature strengths intervention (Seligman et al. 2005), in which applicants are instructed to use their strengths in the daily life in different ways. The use of this intervention is likely to change the situation. If, for example, applied at the workplace, colleagues might react differently to the applicant is using their strengths. If, for instance, kindness is one of the participants' signature strengths, there could

be spillover effects ending up in colleagues engaging in kind acts more often. The same scenario might apply to creativity.

A further limitation is that the hypothesized mechanisms were assessed with single self-report items. Future studies might implement more elaborate indicators to assess the mechanisms, for example more objective measurements like the eye-tracking technology, which could be used to assess attentional deployment (see Sanchez, Vazquez, Gomez, & Joormann, 2014).

This leads to another limitation of the present studies. For an intervention, aiming at increasing well-being in the long-run, the one week interventions might be too brief. However, on the other hand, one week might be too long to investigate how PPIs work, as many other factors can confound the mechanisms. Having a placebo group controls for this, but using a very short time interval might give new and more precise insights. For example, one could observe people while applying a PPI (besides the above mentioned usage of eye-tracking).

The present studies had the Authentic Happiness Inventory (Seligman et al., 2015) and the Center of Epidemiologic Studies of Depression (Radloff, 1977) as dependent measures. Although the measures are often used in PPI studies, there might be other indicators for well-being that would be more suitable to detect changes and other dependent variables may also be influenced by PPIs. For example, one could hypothesize that there are also effects on close friends' and relatives' well-being. Thus, going beyond assessing peer-reported well-being like Rusch and Stolz (2009), to also assess levels of well-being in peers, before and after a person has conducted a PPI, might give more insight.

In the same line, although well-being can reliably be assessed subjectively, having more objective indicators of change in well-being would also be of high relevance. A concern is that while filling in self-report questionnaires on well-being, participants might start making up their minds on their state of happiness and related topics. Thus, as for now, it is

unclear, whether the assessment itself already has an effect on well-being. Objective measurements of well-being would allow testing the possible effects of self-reports. Of course, when interventions are tested in a placebo-controlled study design, the results are controlled for effects of self-reports about well-being, however, the often found initial increases in well-being (when comparing pre and post-test means) in the intervention and in the placebo group could be explained by the use of well-being self-report questionnaires. Thus, the assessment part itself could be used as a positive intervention in practical applications (Poston & Hanson, 2010). Moreover, this first increase in well-being by assessing self-report measures of well-being might mask or diminish larger effects of the positive psychology interventions, as this increase is also present in the placebo group, which would therefore not act as a real placebo group, where the dependent variable should not be influenced. Conclusively, objective indicators would be of great use in PPI studies, and of course many other applications could follow (e.g., assessing well-being in contexts with high social desirability).

Contribution to the Field and Practical Applications

With over 100 complete cases per intervention group, the samples in all three parts of the thesis compared to other PPI-studies are among the ones with the biggest samples (Bolier et al., 2013; Sin & Lyubomirsky, 2009), and compared to humor-based intervention studies in non-clinical settings, the largest so far. Moreover, Part I and II having four follow-ups up to six months provides long-term data, which only a few PPI studies have done so far. Thus, the present thesis makes a valuable contribution to the literature of humor interventions and hopefully also makes them more visible as a special type of intervention in the field of positive psychology.

Having a broader range of different interventions based on a humor-framework available now allows further in-depth research using these interventions. Furthermore, especially the well-established three funny things intervention could already be used in the

practical application (e.g., by psychologist working with positive psychology in their daily practice). Having the great likeability of humor as a trait in mind, there might be many practitioners waiting to incorporate interventions based on humor into their repertoire.

There is a demand in the literature of PPIs for studies going beyond pure effectiveness-testing, namely investigating mechanisms. Having several interventions tested that all focus on the same content, allowed for the development of hypotheses on which strategies might trigger which mechanisms. Thus, in the third part of the thesis, two mechanisms of humor-based PPIs were tested, by varying the time-focus of the three funny things intervention. This study is one of the first to explicitly test working mechanisms of PPIs. The gained insights contribute to a deeper understanding of how humor-based interventions work and might stimulate further research on the proposed mechanisms, perhaps using PPIs focusing on other contents (e.g., the three good things intervention).

A generally great advantage of online PPIs is their scalability: Without much of additional cost, the interventions can be disseminated to a large number of applicants at the same time. Moreover, using online-tools, tailoring the specific intervention or intervention program can be implemented without much effort (Krentzman et al., 2015; Powell et al., 2013). An example would be assigning participants to a specific group of activities such as lesser or signature strengths (Proyer, Gander, et al., 2015b). There, the pre-assessment part on the character strengths was directly used to construct an individualized intervention for each participant. However, results of the meta-analysis by Sin and Lyubomirsky (2009) have shown, that group-administered and individual settings are more effective than self-administered ones. Thus, one needs to decide whether one wants the intervention to be accessible to as many people as possible with a lower effectiveness, or to fewer people but with a greater effectiveness. From the author's perspective, a combination might be the most fruitful way: Online interventions should be available to as many people as possible, and if needed, the applicants should have the possibility to get a face-to-face meeting with a trained

therapist. This could then either be in person or also in the form of a live chat-conversation. Another possibility would be to provide online-forums, supervised by a trained psychologist, where participants can exchange their insights. The forum tool was successfully administered by Martínez-Martí, Avia, and Hernández-Lloreda (2014) as one component of a web-based appreciation of beauty intervention. All in all, online humor-based PPIs could have great value, but there are still many steps to be taken before their full potential can be tapped.

To sum up, the thesis also contributes to the field of humor research in several ways. By conducting placebo-controlled self-administered intervention studies with large samples and follow-ups up to six months, the studies provide evidence for the effectiveness of humor-based PPIs and contribute to a better understanding of why these interventions work. This knowledge might strengthen the position of practitioners working with humor-based interventions. Furthermore, the brief self-administered interventions might be an alternative or a supplement to large programs such as McGhee's (2010a), and might also be more cost-effective.

Moreover, several ideas – deduced from the findings – on how the instructions could be changed to make them better suitable for broad audiences or to tailor them to different individuals are given. Future studies might also consider clinical populations as research on humor intervention in this field seems very promising. Furthermore, the studies included in the present thesis might break ground for further, more theory-based approaches. Additionally, they might help to make a stronger case for the need for more research on humor within the field of positive psychology (McGhee, 2010b), but also increase the awareness of humor researchers that interventions aiming at enhancing well-being can be established in a framework of humor.

General References

Anderson, N. H. (1968). Likableness ratings of 555 personality-trait words. *Journal of Personality and Social Psychology*, *9*, 272–279.

Andrewes, H. E., Walker, V., & O'Neill, B. (2014). Exploring the use of positive psychology interventions in brain injury survivors with challenging behaviour. *Brain Injury*, *28*, 965–971. doi:10.3109/02699052.2014.888764

Attardo, S. (Ed.). (2014). *Encyclopedia of Humor Studies* (Vols. 1-2). Thousand Oaks, CA: Sage.

Beermann, U., & Ruch, W. (2009a). How virtuous is humor? Evidence from everyday behavior. *Humor-International Journal of Humor Research*, *22*, 395–417. doi10.1515/HUMR.2009.023

Beermann, U., & Ruch, W. (2009b). How virtuous is humor? What we can learn from current instruments. *The Journal of Positive Psychology*, *4*, 528–539. doi:10.1080/17439760903262859

Bolier, L., Haverman, M., Westerhof, G. J., Riper, H., Smit, F., & Bohlmeijer, E. (2013). Positive psychology interventions: A meta-analysis of randomized controlled studies. *BMC Public Health*, *13*, 119. doi:10.1186/1471-2458-13-119

Brdar, I., & Kashdan, T. B. (2010). Character strengths and well-being in Croatia: An empirical investigation of structure and correlates. *Journal of Research in Personality*, *44*, 151–154. doi:10.1016/j.jrp.2009.12.001

Buschor, C., Proyer, R. T., & Ruch, W. (2013). Self- and peer-rated character strengths: How do they relate to satisfaction with life and orientations to happiness? *The Journal of Positive Psychology*, *8*, 116–127. doi:10.1080/17439760.2012.758305

Cattell, R. B. & Schuerger, J. M. (1978). *Personality theory in action. Handbook for the Objective-Analytic (O-A) Test Kit.* Champaign, IL: Institute for Personality and Ability Testing.

Chick, G., Yarnal, C., & Purrington, A. (2012). Play and mate preference: Testing the signal theory of adult playfulness. *American Journal of Play, 4,* 407-440.

Chapman, A. J. & Foot, H. C. (1992). *Humor and laughter: Theory, research, and applications* (2nd ed.). New York, NY: Transaction Publishers.

Costa Fernandes, S., & Arriaga, P. (2010). The effects of clown intervention on worries and emotional responses in children undergoing surgery. *Journal of Health Psychology, 15,* 405-415.

Craik, K. H., Lampert, M. D., & Nelson, A. J. (1996). Sense of humor and styles of everyday humorous conduct. *Humor - International Journal of Humor Research*, *9*, 273–302.

Crawford, S. A., & Caltabiano, N. J. (2011). Promoting emotional well-being through the use of humour. *The Journal of Positive Psychology*, *6*, 237–252. doi:10.1080/17439760.2011.57708

Csikszentmihalyi, M. (1990). *Flow: The Psychology of Optimal Experience.* New York, NY: Harper and Row.

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction With Life Scale. *Journal of Personality Assessment*, *49*, 71–75. doi:10.1207/s15327752jpa4901_13

Diessner, R., Rust, T., Solom, R.C., Frost, N., & Parsons, L. (2006). Beauty and hope: A moral beauty intervention. *Journal of Moral Education, 35*, 301–317. doi:10.1080/03057240600874430

Ding, T., Mullan, B., & Xavier, K. (2014). Does subjective well-being predict health-enhancing behaviour? The example of fruit and vegetable consumption. *British Food Journal, 116*, 598-610. doi:10.1108/BFJ-07-2012-0177

Dionigi, A., Sangiorgi, D., & Flangini, R. (2014). Clown intervention to reduce preoperative anxiety in children and parents: A randomized controlled trial. *Journal of Health Psychology, 19,* 369–380. doi:10.1177/1359105312471567

Eid, M., & Larsen, R. J. (2008). *The science of subjective well-being.* New York, NY: Guilford Press.

Ekman, P. (2003). *Emotions revealed: Recognizing faces and feelings to improve communication and emotional life.* New York, NY: Times Books.

Eysenck, H. J. (1942). The appreciation of humour: An experimental and theoretical study. *British Journal of Psychology. General Section*, *32*, 295–309. doi:10.1111/j.2044-8295.1942.tb01027.x

Eysenck H. J. & Eysenck S. B. G. (1975). *Manual of the Eysenck Personality Questionnaire.* London, UK: Hodder & Stoughton.

Fordyce, M. W. (1977). Development of a program to increase personal happiness. *Journal of Counseling Psychology, 24,* 511-521.

Fordyce, M. W. (1983). A program to increase happiness: Further studies. *Journal of Counseling Psychology*, *30*, 483–498.

Fredrickson, B. L. (1998). What good are positive emotions? *Review of General Psychology*, *2*, 300 – 319. doi:10.1037/1089-2680.2.3.300

Freud, S. (2012). *Der Witz und seine Beziehung zum Unbewussten. Der Humor* [The joke and its relationship to the sub-consciousness. The humor] (3rd ed.). Frankfurt am Main, Germany: Fischer.

Furnham, A., & Cheng, H. (2000). Lay theories of happiness. *Journal of Happiness Studies*, *1*, 227–246. doi:10.1023/A:1010027611587

Gander, F., Proyer, R. T., Ruch, W., & Wyss, T. (2012). The good character at work: an initial study on the contribution of character strengths in identifying healthy and unhealthy work-related behavior and experience patterns. *International Archives of Occupational and Environmental Health, 85,* 895–904. doi:10.1007/s00420-012-0736-x

Gander, F., Proyer, R. T., Ruch, W., & Wyss, T. (2013). Strength-based positive interventions: Further evidence for their potential in enhancing well-being and alleviating depression. *Journal of Happiness Studies*, *14*, 1241–1259. doi:10.1007/s10902-012-9380-0

Ganz, F. D., & Jacobs, J. M. (2014). The effect of humor on elder mental and physical health. *Geriatric Nursing, 35,* 205–211. doi:10.1016/j.gerinurse.2014.01.005

Giannopoulos, V. L., & Vella-Brodrick, D. A. (2011). Effects of positive interventions and orientations to happiness on subjective well-being. *The Journal of Positive Psychology*, *6*, 95–105. http://doi.org/10.1080/17439760.2010.545428

Harzer, C., & Ruch, W. (2012). When the job is a calling: The role of applying one's signature strengths at work. *The Journal of Positive Psychology*, *7*, 362–371. doi:10.1080/17439760.2012.702784

Hehl, F.-J., & Ruch, W. (1985). The location of sense of humor within comprehensive personality spaces: An exploratory study. *Personality and Individual Differences*, *6*, 703–715. doi:10.1016/0191-8869(85)90081-9

Hirsch, R. D., Junglas, K., Konradt, B., & Jonitz, M. F. (2010). Humortherapie bei alten Menschen mit einer Depression: Ergebnisse einer empirischen Untersuchung. Lebenszufriedenheit [Humor therapy in the depressed elderly. Results of an empirical study]. *Zeitschrift für Gerontologie und Geriatrie*, *43*, 42–52. doi:10.1007/s00391

Hofmann, J., Platt, T., Ruch, W., Niewiadomski, R., & Urbain, J. (2015). The influence of a virtual companion on amusement when watching funny films. *Motivation and Emotion, 39,* 434–447. doi:10.1007/s11031-014-9461-y

Jahoda, M. (1958). Current concepts of positive mental health. *APA PsycNET*. doi:10.1037/11258-000

Johnston, C. S., Luciano, E. C., Maggiori, C., Ruch, W., & Rossier, J. (2013). Validation of the German version of the Career Adapt-Abilities Scale and its relation to orientations

to happiness and work stress. *Journal of Vocational Behavior*, *83*, 295–304. doi:10.1016/j.jvb.2013.06.002

Kahneman, D., Diener, E., & Schwarz, N. (1999). *Well-being: The foundations of hedonic psychology.* New York, NY: Russell Sage Foundation.

Keyes, C. L. M. (1998). Social well-being. *Social Psychology Quarterly*, *61*, 121–140. doi:10.2307/2787065

Keyes, C. L. M. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of Health and Social Behavior*, *43*, 207–222. doi:10.2307/3090197

Kline, P. (1977). The psychoanalytic theory of humour and laughter. In A. J., Chapman & H. C., Foot (Eds.), *It's a funny thing, humour* (pp. 7-12). Oxford, UK: Pergamon Press.

Köhler, G., & Ruch, W. (1996). Sources of variance in current sense of humor inventories: How much substance, how much method variance? *Humor - International Journal of Humor Research*, *9*, 363–398. doi:10.1515/humr.1996.9.3-4.363

Konradt, B., Hirsch, R. D., Jonitz, M. F., & Junglas, K. (2013). Evaluation of a standardized humor group in a clinical setting: a feasibility study for older patients with depression: Humor therapy for older patients with depression. *International Journal of Geriatric Psychiatry*, *28*, 850–857. doi:10.1002/gps.3893

Krentzman, A. R., Mannella, K. A., Hassett, A. L., Barnett, N. P., Cranford, J. A., Brower, K. J., … Meyer, P. S. (2015). Feasibility, acceptability, and impact of a web-based gratitude exercise among individuals in outpatient treatment for alcohol use disorder. *The Journal of Positive Psychology.* Advance online publication. doi:10.1080/17439760.2015.1015158

Low, L.-F., Brodaty, H., Goodenough, B., Spitzer, P., Bell, J.-P., Fleming, R., … Chenoweth, L. (2013). The Sydney multisite intervention of laughterbosses and elderclowns (SMILE) study: cluster randomised trial of humour therapy in nursing homes. *BMJ Open*, *3*(1), e002072. doi:10.1136/bmjopen-2012-002072

Lowis, M. J. (1997). A humor workshop program to aid coping with life stress. *Mankind Quarterly, 38(1/2),* 25.

Luborsky, L. B., & Cattell, R. B. (1947). The validation of personality factors in humor. *Journal of Personality*, *15*, 283–291. doi:10.1111/j.1467-6494.1947.tb01068.x

Maslow, AH. 1954. *Motivation and personality*, New York, NY: Harper.

Martin, R. A. (2001). Humor, laughter, and physical health: Methodological issues and research findings. *Psychological Bulletin*, *127*, 504. doi:10.1037/0033-2909.127.4.504

Martin, R. A. (2007). *The psychology of humor: An integrative approach.* Burlington, VT: Elsevier Academic Press.

Martin, R. A., Puhlik-Doris, P., Larsen, G., Gray, J., & Weir, K. (2003). Individual differences in uses of humor and their relation to psychological well-being: Development of the humor styles questionnaire. *Journal of Research in Personality*, *37*, 48–75. doi:10.1016/S0092-6566(02)00534-2

Martínez-Martí, M. L., & Ruch, W. (2014). Character strengths and well-being across the life span: data from a representative sample of German-speaking adults living in Switzerland. *Frontiers in Psychology: Personality and Social Psychology*, *5*, 1253. doi:10.3389/fpsyg.2014.01253

Martínez-Martí, M. L., Avia, M. D., & Hernández-Lloreda, M. J. (2014). Appreciation of beauty training: A web-based intervention. *The Journal of Positive Psychology*, *9*, 477–481. doi:10.1080/17439760.2014.920512

Matte, G. (2001). A psychoanalytical perspective of humor. *Humor - International Journal of Humor Research*. doi:10.1515/humr.2001.001

McGhee, P. E. (2010a). *Humor as survival training for a stressed-out world: The 7 humor habits program.* Bloomington, IN: Author House.

McGhee, P. E. (2010b). *Humor: The lighter path to resilience and health.* Bloomington, IN: Author House.

McGhee, P. E. & Goldstein, J. H. (1983a). *Handbook of humor research: Applied studies*. New York, NY: Springer.

McGhee, P. E. & Goldstein, J. H. (1983b). *Handbook of humor research: Basic issues*. New York, NY: Springer.

Mitchell, J., Vella-Brodrick, D., & Klein, B. (2010). Positive psychology and the internet: A mental health opportunity. *E-Journal of Applied Psychology*, *6*(2). doi:10.7790/ejap.v6i2.230

Mongrain, M., Chin, J. M., & Shapira, L. B. (2011). Practicing compassion increases happiness and self-esteem. *Journal of Happiness Studies*, *12*, 963–981. doi:10.1007/s10902-010-9239-1

Morreall, J. (2009). *Comic Relief: A comprehensive philosophy of humor.* West Sussex, UK: Wiley-Blackwell.

Mullan, B., & Xavier. K. (2013). Predicting saturated fat consumption: Exploring the role of subjective wellbeing. *Psychology, Health & Medicine, 18*, 515-521. doi: 10.1080/13548506.2013.764456

Müller, L., & Ruch, W. (2011). Humor and strengths of character. *The Journal of Positive Psychology*, *6*, 368–376. doi:10.1080/17439760.2011.592508

Myers, D. G. (2000). The funds, friends, and faith of happy people. *The American Psychologist*, *55*(1), 56–67.

Nevo, O., Aharonson, H., & Klingman, A. (1998). The development and evaluation of a systematic program for improving sense of humor. In W. Ruch (Ed.), *The sense of humor: Exploration of a personality characteristic* (pp. 385-404). New York, NY: Mouton de Gruyter.

Otake, K., Shimai, S., Tanaka-Matsumi, J., Otsui, K., & Fredrickson, B. L. (2006). Happy people become happier through kindness: A counting kindnesses intervention. *Journal of Happiness Studies*, *7*, 361–375. doi:10.1007/s10902-005-3650-z

Park, N., Peterson, C., & Seligman, M. E. (2004). Strengths of character and well-being: A closer look at hope and modesty. *Journal of Social and Clinical Psychology*, *23*, 628–634. doi:10.1521/jscp.23.5.628.50749

Parks, A. C., Della Porta. M. D., Pierce, R. S., Zilca, R., & Lyubomirsky, S. (2012). Pursuing happiness in everyday life: The characteristics and behaviors of online happiness seekers. *Emotion, 12*, 1222-1234. doi:10.1037/a0028587.

Pawelski, J. O. (2003). William James, positive psychology, and healthy-mindedness. *The Journal of Speculative Philosophy*, *17*, 53–67.

Peterson, C., Park, N., & Seligman, M. E. (2005a). Assessment of character strengths. In G. P. Koocher, J. C. Norcross, & S. S. Hill III (Eds.), Psychologists' desk reference (2nd ed., Vol. 3, pp. 93–98). New York, NY: Oxford University Press.

Peterson, C., Park, N., & Seligman, M. E. P. (2005b). Orientations to happiness and life satisfaction: The full life versus the empty life. *Journal of Happiness Studies*, *6*, 25–41. doi:10.1007/s10902-004-1278-z

Peterson, C., Park, N., & Seligman, M. E. P. (2006). Greater strengths of character and recovery from illness. *The Journal of Positive Psychology*, *1*, 17–26. doi:10.1080/17439760500372739

Peterson, C., Ruch, W., Beermann, U., Park, N., & Martin EP Seligman. (2007). Strengths of character, orientations to happiness, and life satisfaction. *The Journal of Positive Psychology, 2,* 149–156. doi:10.1080/17439760701228938

Peterson, C., & Seligman, M. (2004). *Character strengths and virtues: A handbook and classification*. Washington, DC: New York: American Psychological Association / Oxford University Press.

Pollock, N. C., Noser, A. E., Holden, C. J., & Zeigler-Hill, V. (2015). Do orientations to happiness mediate the associations between personality traits and subjective well-being? *Journal of Happiness Studies*. doi:10.1007/s10902-015-9617-9

Poston, J. M., & Hanson, W. E. (2010). Meta-analysis of psychological assessment as a therapeutic intervention. *Psychological Assessment, 22,* 203–212. doi:10.1037/a0018679

Proyer, R. T. (2014). Playfulness over the life-course and its relation to happiness: Results from an online survey. *Zeitschrift für Gerontologie und Geriatrie, 47*, 508-512. doi:10.1007/s00391-013-0539-z

Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2013). What good are character strengths beyond subjective well-being? The contribution of the good character on self-reported health-oriented behavior, physical fitness, and the subjective health status. *The Journal of Positive Psychology*, *8*, 222–232. doi:10.1080/17439760.2013.777767

Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2014). Positive psychology interventions in people aged 50–79 years: Long-term effects of placebo-controlled online interventions on well-being and depression. *Aging & Mental Health*, *18*, 997–1005. doi:10.1080/13607863.2014.899978

Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2015a). Measuring happiness with the authentic happiness inventory: Addressing its psychometric properties, validity, and role in intervention studies. Submitted for publication.

Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2015b). *Nine beautiful things: A self-administered online positive psychology intervention on the beauty in nature, arts, and behaviors increases happiness and ameliorates depressive symptoms.* Submitted for publication.

Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2015c). Strengths-based positive psychology interventions: A randomized placebo-controlled online trial on long-term effects for a signature strengths- vs. a lesser strengths-intervention. *Frontiers in*

Psychology: Personality and Social Psychology, *6*, 456. doi: 10.3389/fpsyg.2015.00456

Proyer, R. T., Ruch, W., & Buschor, C. (2013). Testing Strengths-Based Interventions: A Preliminary Study on the Effectiveness of a Program Targeting Curiosity, Gratitude, Hope, Humor, and Zest for Enhancing Life Satisfaction. *Journal of Happiness Studies*, *14*, 275–292. doi:10.1007/s10902-012-9331-9

Proyer, R. T., & Wagner, L. (2015). Playfulness in adults revisited: The signal theory in German speakers. *American Journal of Play, 7,* 201-227.

Proyer, R. T., Wellenzohn, S., Gander, F., & Ruch, W. (2015). Toward a better understanding of what makes positive psychology interventions work: Predicting happiness and depression from the person × intervention fit in a follow-up after 3.5 years. *Applied Psychology: Health and Well-Being*, *7*, 108–128. doi:10.1111/aphw.12039

Proyer, R. T., Wellenzohn, S., & Ruch, W. (2014). Character and dealing with laughter: The relation of self- and peer-reported strengths of character with gelotophobia, gelotophilia, and katagelasticism. *The Journal of Psychology*, *148*(1), 113–132. doi:10.1080/00223980.2012.752336

Quoidbach, J., Mikolajczak, M., & Gross, J. J. (2015). Positive interventions: An emotion regulation perspective. *Psychological Bulletin*, *141*, 655–693. doi:10.1037/a0038648

Radloff, L. S. (1977). The CES-D scale. A self-report depression scale for research in the general population. *Applied Psychological Measurement*, *1*, 385–401. doi:10.1177/014662167700100306

Raskin, V. (2008). *The primer of humor research.* Berlin, Germany: Mouton de Gruyter.

Rogers, CR. (1961). *On becoming a person: A therapist's view of psychotherapy*. Boston, MA: Houghton Mifflin.

Ruch, W. (1996). Measurement approaches to the sense of humor: Introduction and overview. *Humor - International Journal of Humor Research*, *9*, 239–250.

Ruch, W. (2001). The perception of humor. In A. W. Kaszniak (Ed.), *Emotion, Qualia, and Consciousness* (pp. 410–425). Tokyo, Japan: Word Scientific Publisher.

Ruch, W. (2007). *The sense of humor: Explorations of a personality characteristic* (2nd ed.). Berlin, Germany: Walter de Gruyter.

Ruch, W. (2008). Psychology of humor. In V. Raskin (Ed.), *The primer of humor research* (pp. 17–100). Berlin, Germany: Mouton de Gruyter.

Ruch, W. (2012). Towards a new structural model of the sense of humor: Preliminary findings. In *AAI Symposium on Artificial Intelligence of Humor Proceedings* (pp. 2–4). Retrieved from http://www.aaai.org/ocs/index.php/FSS/FSS12/paper/viewFile/5652/5809

Ruch, W., Beermann, U., & Proyer, R. T. (2009). Investigating the humor of gelotophobes: Does feeling ridiculous equal being humorless? *Humor - International Journal of Humor Research*, *22*, 111–143.

Ruch, W., Harzer, C., Proyer, R. T., Park, N., & Peterson, C. (2010). Ways to happiness in German-speaking countries: The adaptation of the German version of the Orientations to Happiness questionnaire in paper-pencil and internet samples. *European Journal of Psychological Assessment*, *26*, 227–234. doi:10.1027/1015-5759/a000030

Ruch, W. F., & Heintz, S. (2013). Humour styles, personality and psychological well-being: What's humour got to do with it? *The European Journal of Humour Research*, *1*(4), 1–24.

Ruch, W., & Hofmann, J. (2013). A temperament approach to humor. In P. Gremigni (Ed). *Humor and health Promotion* (pp. 79-112). Nova Science Publishers.

Ruch, W., & Köhler, G. (2007) A temperament approach to humor. In W. Ruch (Ed.). *The sense of humor: Explorations of a personality characteristic* (2nd ed.). Berlin, Germany: Walter de Gruyter.

Ruch, W., Martínez-Martí, M. L., Heintz, S., & Brouwers, S. A. (2014). Short form of the Orientations to Happiness Questionnaire for the German-speaking countries: Development and analysis of the psychometric properties. *Swiss Journal of Psychology*, *73*, 225–234. doi:10.1024/1421-0185/a000141

Ruch, W., & McGhee, P. E. (2014). Humor intervention programs. In A. C. Parks & S. Schueller (Eds.), *The Wiley Blackwell Handbook of positive psychological interventions* (1. ed., pp. 179–193). West Sussex, UK: John Wiley & Sons.

Ruch, W., & Proyer, R. T. (2008). The fear of being laughed at: Individual and group differences in Gelotophobia. *Humor: International Journal of Humor Research, 21,* 47–67. doi:10.1515/HUMOR.2008.002

Ruch, W., & Proyer, R. T. (2009a). Who fears being laughed at? The location of gelotophobia in the Eysenckian PEN-model of personality. *Personality and Individual Differences*, *46*, 627–630. doi:10.1016/j.paid.2009.01.004

Ruch, W., & Proyer, R. T. (2009b). Extending the study of gelotophobia: On gelotophiles and katagelasticists. *Humor: International Journal of Humor Research, 22,* 183–212. doi:10.1515/HUMR.2009.009

Ruch, W., & Proyer, R. T. (2015). Mapping strengths into virtues: The relation of the 24 VIA-strengths to six ubiquitous virtues. *Frontiers in Psychology*, *6*. doi:10.3389/fpsyg.2015.00460

Ruch, W., Proyer, R. T., Harzer, C., Park, N., Peterson, C., & Seligman, M. E. P. (2010). Values in Action Inventory of Strengths (VIA-IS): Adaptation and validation of the German version and the development of a peer-rating form. *Journal of Individual Differences*, *31*(3), 138–149. doi:10.1027/1614-0001/a000022

Ruch, W., Rodden, F. A., & Proyer, R. T. (2011). Humor and other positive interventions in medical and therapeutic settings. In Kirkcaldy, Bruce D. (Ed.), *The art and science of*

health care: Psychology and human factors for practitioners. Göttingen, Germany: Hogrefe Publishers.

Rudnick, A., Kohn, P. M., Edwards, K. R., Podnar, D., Caird, S., & Martin, R. (2013). Humour-related interventions for people with mental illness: A randomized controlled pilot study. *Community Mental Health Journal*. http://doi.org/10.1007/s10597-013-9685-4

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, *57*, 1069–1081.

Samson, A. C., Huber, O., & Ruch, W. (2013). Seven decades after Hans Asperger's observations: A comprehensive study of humor in individuals with Autism Spectrum Disorders. *Humor - International Journal of Humor Research*, *26*, 441–460.

Sanchez, A., Vazquez, C., Gomez, D., & Joormann, J. (2014). Gaze-fixation to happy faces predicts mood repair after a negative mood induction. *Emotion (Washington, D.C.)*, *14*, 85–94. doi:10.1037/a0034500

Schiffrin, H. H., & Nelson, S. K. (2010). Stressed and happy? Investigating the relationship between happiness and perceived stress. *Journal of Happiness Studies, 11*, 33-39. doi:10.1007/s10902-008-9104-7

Schueller, S. M. (2012). Personality fit and positive interventions: Extraverted and introverted individuals benefit from different happiness increasing strategies. *Psychology, 3*, 1166–1173. doi:10.4236/psych.2012.312A172

Schueller, S. M. (2014). Person–activity fit in positive psychological interventions. In Parks, A. C., & Schueller, S. M. (Eds.), *The Wiley Blackwell Handbook of Positive Psychological Interventions* (pp. 385–402). West Sussex, UK: John Wiley & Sons. doi/10.1002/9781118315927.fmatter/summary

Schueller, S. M., & Seligman, M. E. P. (2010). Pursuit of pleasure, engagement, and meaning: Relationships to subjective and objective measures of well-being. *The Journal of Positive Psychology*, *5*, 253–263. doi:10.1080/17439761003794130

Seligman, M. E. P. (1999). *The presidents address.* In R. D. Fowler, M. E. P. Seligman, & G. P. Koocher (Eds). The APA 1998 Annual Report. *American Psychologist*, *54*, 537. doi:10.1037/0003-066X.54.8.537

Seligman, M. E. P. (2004). *Authentic happiness: Using the new positive psychology to realize your potential for lasting fulfillment.* New York, NY: Atria Books.

Seligman, M. E. P. (2011). *Flourish: A visionary new understanding of happiness and well-being*. New York, NY: Atria Books.

Seligman, M. E. P., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist*, *55*, 5–14. doi:10.1037/0003-066X.55.1.5

Seligman, M. E. P., Steen, T. A., Park, N., & Peterson, C. (2005). Positive psychology progress: Empirical validation of interventions. *American Psychologist*, *60*, 410–421. doi:10.1037/0003-066X.60.5.410

Senf, K., & Liau, A. K. (2013). The effects of positive interventions on happiness and depressive symptoms, with an examination of personality as a moderator. *Journal of Happiness Studies*, *14*, 591–612. doi:10.1007/s10902-012-9344-4

Shapira, L. B., & Mongrain, M. (2010). The benefits of self-compassion and optimism exercises for individuals vulnerable to depression. *The Journal of Positive Psychology*, *5*, 377–389. doi:10.1080/17439760.2010.516763

Sin, N. L., & Lyubomirsky, S. (2009). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice-friendly meta-analysis. *Journal of Clinical Psychology*, *65*, 467–487. doi:10.1002/jclp.20593

Suls, J. M. (1983). Cognitive processes in humor appreciation. In P. E. McGhee & J. H. Goldstein (Eds.), *Handbook of Humor Research* (pp. 39–57). New York, NY: Springer New York.

Titze, M. (1995). Die heilende Kraft des Lachens [The healing power of laughter]. Munich, Germany: Kösel.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54,* 1063–1070. doi:10.1037/0022-3514.54.6.1063

Weber, M., & Ruch, W. (2009). Das gute Leben bei Kindern und Jugendlichen [The good life of children and adolescents]. *Psychologie und Erziehung, 35,* 21-39. doi:10.5167/uzh-20940

Weber, M., & Ruch, W. (2012). The role of character strengths in adolescent romantic relationships: An initial study on partner selection and mates' life satisfaction. *Journal of Adolescence*, *35*, 1537–1546. doi:10.1016/j.adolescence.2012.06.002

WHO. *Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference*, New York, 19-22 June 1946, and entered into force on 7 April 1948.

Zabihi, R., Ketabi, S., Tavakoli, M, & Ghadiri, M. (2014). Examining the internal consistency reliability and construct validity of the Authentic Happiness Inventory (AHI) among Iranian EFL learners. *Current Psychology, 33*, 377-392. doi:10.1007/s12144-014-9217-6

Zillmann, D. (1983). Disparagement humor. In P. E. McGhee & J. H. Goldstein (Eds.), *Handbook of Humor Research* (pp. 85–107). New York, NY: Springer New York.

Ehrenwort

Hiermit erkläre ich, dass die Dissertation von mir selbst ohne unerlaubte Beihilfe verfasst worden ist.

Zürich, 11.04.2017

Ort und Datum Unterschrift

Curriculum Vitae

Personal Information

Sara Wellenzohn
Date of birth: 24.09.1986 in Uster, Switzerland

Address:
Besenrainstrasse 33
8038 Zürich
E-Mail: sara.wellenzohn@gmail.com

Education

2011 - 2015	Doctorate Studies at the Section of Personality and Assessment at the University of Zurich Dissertation: Development and Evaluation of Humor-Based Online Positive Psychology Interventions in Placebo-Controlled Designs
2005 – 2010	Studies in Psychology, Psychopathology in Children and Adolescents and Criminology at the University of Zurich Master thesis: Charakterstärken in Jugendverbänden [Character strengths in Youth Organizations]
2001 – 2005	Matura; Kantonsschule Zürcher Oberland, Wetzikon

Professional Experience

Since 03/2016	Lecturer for Positive Psychology Interventions (Certificate of Advanced Studies in Positive Psychology: Post-graduate level) at the University of Zurich
Since 03/2016	Assistant Psychologist at the Swiss Armed Forces (Recruiting and Selection)
Since 09/2015	Project manager of psychological tests at a scientific publisher: Hogrefe AG in Bern

Since 06/2014	Board and founding member, and treasurer of the Swiss Positive Psychology Association (SWIPPA)
09/2014 – 01/2016	Lecturer for the "Interactive Proseminar" (Bachelor-level in Psychology) at the University of Zurich
01/2011 – 08/2015	Doctorate student in a Swiss Science National Foundation (SNSF)-project entitled Positive Interventions: Empirical studies on enhancing satisfaction with life (no. 100014_132512), at the section of Personality and Assessment at the Department of Psychology, University of Zurich. Project leaded by Prof. Dr. W. Ruch and PD Dr. R. T. Proyer
10/2011 – 01/2014	Teaching assistant at the Distance Learning University of Switzerland [Universitäre Fernstudien Schweiz] for the module Personality and Individual Differences
10/2007 – 12/2010	Research assistant at the Zurich University of Applied Sciences at the Section of Applied Linguistics. Project leaded by Prof. Dr. S. Manchen Spörri
02/2009 – 07/2010	Tutorship at the section of Personality and Assessment for the lecture "Psychological Assessment" at the Department of Psychology, University of Zurich
01/2010 – 03/2010	Internship at the Vocational and academic counseling center of the Canton of Zurich
08/2009 – 12/2009	Internship at the school psychological counseling center in Hinwil

Memberships

Founding and board member of the Swiss Positive Psychology Association (SWIPPA)
Member of the International Positive Psychology Association (IPPA)

Award

Best symposium presentation 2014 at the 14th International Summer School and Symposium on Humour and Laughter: Theory, Research and Applications

Publications

Journal articles (with peer-review)

Wellenzohn, S., Proyer, R. T., & Ruch, W. (2016). How do positive psychology interventions work? A short-term placebo-controlled humor-based study on the role of the time focus. *Personality and Individual Differences, 96,* 1–9. doi:10.1016/j.paid.2016.02.056

Wellenzohn, S., Proyer, R. T., & Ruch, W. (2016). Humor-based online positive psychology interventions: A randomized placebo-controlled long-term trial. *Journal of Positive Psychology, 11,* 584–594. doi:10.1080/17439760.2015.1137624

Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2016). Addressing the role of personality, ability, and positive and negative affect in positive psychology interventions: Findings from a randomized intervention based on the Authentic Happiness theory and extensions. *Journal of Positive Psychology, 11,* 609–621. doi:10.1080/17439760.2015.1137622

Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2016). Nine beautiful things: A self-administered online positive psychology intervention on the beauty in nature, arts, and behaviors increases happiness and ameliorates depressive symptoms. *Personality and Individual Differences, 94,* 189–193. doi:10.1016/j.paid.2016.01.028

Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2015). Strengths-based positive psychology interventions: A randomized placebo-controlled online trial on long-term effects for a signature strengths- vs. a lesser strengths-intervention. *Frontiers in Psycholgy: Personality and Social Psychology, 6,* 456. doi:10.3389/fpsyg.2015.00456

Proyer, R. T., Wellenzohn, S., Gander, F., & Ruch, W. (2015). Toward a better understanding of what makes positive interventions work: Predicting happiness and depression from the person×intervention-fit in a follow-up after 3.5 years. *Applied Psychology: Health and Well Being, 7,* 108–128. doi:10.1111/aphw.12039

Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2014). Positive psychology interventions in people aged 50-79 years: Long-term effects of placebo-controlled online-interventions on well-being and depression. *Aging and Mental Health, 18, 997–1005.* doi:10.1080/13607863.2014.899978

Proyer, R. T., Wellenzohn, S., & Ruch, W. (2014). Character and dealing with laughter: The relation of self- and peer-reported strengths of character with gelotophobia, gelotophilia, and katagelasticism. *The Journal of Psychology: Interdisciplinary and Applied, 148*, 113–132. doi:10.1080/00223980.2012.752336

Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2013). What good are character strengths beyond subjective well-being? The contribution of the good character on self-reported health-oriented behavior, physical fitness, and the subjective health status. *The Journal of Positive Psychology, 8,* 222–232. doi:10.1080/17439760.2013.77776

Book chapters

Wellenzohn, S. (2017). One door closes, another one opens. In L. Bormans (Ed.), The world book of hope. Tielt, Belgium: Lannoo Publishers

Wellenzohn, S. (2015). Wenn sich eine Tür schliesst, öffnet sich eine andere. In L. Bormans (Ed.), Hoffnung. Köln, Deutschland: DuMont

Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2014). The European Football Championship as a positive festivity: Changes in strengths of character before, during, and after the EURO 2008 in Switzerland. In H. Águeda Marujo & L. M. Neto (Eds.), *Positive nations and communities* (Vol. 6; Cross-cultural advancements in positive psychology; pp. 119-134). Dordrecht, NL: Springer.

Invited talks

Hurni, L., Wellenzohn, S., & Gander, F. (2015, November), Coaching und Positive Psychologie — Hand in Hand? Workshop held at the 2nd Fachtagung der Schweizerischen Gesellschaft für Positive Psychologie, November 21, Zurich, Switzerland.

Wellenzohn, S., & Gander, F. (2012, March). *Charakterstärken in der Praxis.* Presentation held at the Arbeitsmarktcenter der Schweizerischen Bundesbahnen, March 23, Olten, Switzerland.

Media Coverage

2015: Interview in der Sendung Ratgeber zum Thema Optimismus (Radio broadcast SRF1, 2015)

Congress Contributions

Talks

Wellenzohn, S., Proyer, R. T., Gander, F., & Ruch, W. (2015, July). *Assessing happiness with the Authentic Happiness Inventory: Evaluation of its psychometric properties, initial validation, and its use in intervention studies.* Paper presented at the 13th European Conference on Psychological Assessment, Zurich, Switzerland.

Gander, F., & Wellenzohn, S. (2014, July). *Strengths-based online positive psychology interventions and the role of personality.* Paper presented at the 17th European Conference on Personality, Lausanne, Switzerland. (Presentation held at the Symposium: Positive psychology and the study of positive traits: Recent research from adult playfulness to strengths of character)

Wellenzohn, S., Proyer, R. T., & Ruch, W. (2014, July). *A placebo-controlled online study on long-term effects of humor-based variants of established positive interventions.* Paper presented at the 7th European Conference on Positive Psychology, Amsterdam, Netherlands.

Wellenzohn, S., Proyer, R. T., & Ruch, W. (2014, July). *Humour-based online positive psychology interventions: A placebo-controlled study on the long-term effects on well-being.* Paper presented at the 14th International Summer School and Symposium on Humour and Laughter: Theory, Research and Applications, Sheffield, Great Britain.

Wellenzohn, S., Proyer, R. T., & Ruch, W. (2012, June). *The virtuousness of gelotophobes, gelotophiles and katagelasticists: Studying the relation of self-assessed and peer-rated character strengths with three dispositions towards ridicule and being laughed at.* Paper presented at the 24th International Society of Humor Studies (ISHS) Congress, 25-29 of June 2012, Krakow, Poland.

Gander, F., Proyer, R. T., Wellenzohn, S., & Ruch, W. (2012, June). *The development of a research-instrument to assess the components of Seligman's (2011) PERMA-theory of well-being*. Paper presented at the 6th European Conference on Positive Psychology (ECPP), Moscow, Russia.

Gander, F., Proyer, R. T., Wellenzohn, S., & Ruch, W. (2012, June). *Further evidence on the effects of online Positive Psychology interventions*. Paper presented at the 6th European Conference on Positive Psychology (ECPP), Moscow, Russia.

Posters

Wellenzohn, S., Proyer, R. T., Gander, F., & Ruch, W. (2015, July). *Measuring the propensity to perceive good things and testing it as a mediator in interventions: The case of the three "good things"- intervention.* Poster presented at the 13th European Conference on Psychological Assessment, Zurich, Switzerland.

Gander, F., Proyer, R. T., Wellenzohn, S., & Ruch, W. (2015, July). *The subjective quality of environmental conditions in different life domains and satisfaction with these domains: Assessment and Malleability.* Poster presented at the 13th European Conference on Psychological Assessment, Zurich, Switzerland.

Wellenzohn, S., Proyer, R. T., Wagner, L., & Ruch, W. (2015, June). *Humor-based variants of established positive psychology interventions: A placebo-controlled online study to test their long-term effects.* Poster presented at the 4th World Congress on Positive Psychology, Florida, USA.

Wellenzohn, S., Proyer, R. T., Gander, F., & Ruch, W. (2015, May). *Online positive psychology interventions also for people over 50? Long-term effects on well-being in a placebo-controlled intervention study.* Poster presented at the 12th LiMaDoKo of the Department of Psychology at the University of Zurich, Zurich, Switzerland.

Gander, F., Proyer, R. T., Wellenzohn, S., & Ruch, W. (2015, May). *Who benefits from a positive psychology intervention? Indicators of a person × intervention fit predicting the effectiveness after 3.5 years.* Poster presented at the 12th LiMaDoKo of the Department of Psychology at the University of Zurich, Zurich, Switzerland.

Gander, F., Proyer, R. T., Wellenzohn, S., & Ruch, W. (2014, July). *Moderating effects of personality on the effectiveness of positive psychology interventions.* Poster presented at the 17th European Conference on Personality, Lausanne, Switzerland.

Gander, F., Proyer, R. T., Wellenzohn, S., & Ruch, W. (2014, July). *Positive psychology interventions in older adults: Effects of a six-months placebo-controlled online intervention.* Poster presented at the 7th European Conference on Positive Psychology, Amsterdam, Netherlands.

Proyer, R. T., Wellenzohn, S., & Ruch, W. (2014, July). *The moderating role of self-rated sense of humor on changes in happiness and depression in humor-based positive psychological interventions.* Poster presented at the 17th European Conference on Personality, Lausanne, Switzerland.

Wellenzohn, S., Proyer, R. T., Gander, F., Hentz, E., & Ruch, W. (2014, July). *The role of positive emotions in positive interventions: A study using daily assessment of positive emotions.* Poster presented at the 7th European Conference on Positive Psychology, Amsterdam, Netherlands.

Wellenzohn, S., Proyer, R. T., Gander, F., & Ruch, W. (2014, July). *What intervention-specific characteristics predict happiness and depression in those that participate in positive interventions? A four-year follow-up.* Poster presented at the 7th European Conference on Positive Psychology, Amsterdam, Netherlands.

Wellenzohn, S., Proyer, R. T., & Ruch, W. (2014, May). *Testing humor-based variants of positive interventions.* Poster presented at the 11th LiMaDoKo of the Department of Psychology at the University of Zurich, Zurich, Switzerland.

Wellenzohn, S., Hentz, E., Proyer, R. T., Gander, F., & Ruch, W. (2013, September). *The role of positive emotions in positive interventions.* Poster presented at the 13th Congress of the Swiss Society of Psychology (SSP), Basel, Switzerland.

Wellenzohn, S., Proyer, R. T., & Ruch, W. (2013, September). *Three funny things and more: Online interventions based on humor.* Poster presented at the 13th Congress of the Swiss Society of Psychology (SSP), Zurich, Switzerland.

Wellenzohn, S., Hentz, E., Proyer, R. T., Gander, F., & Ruch, W. (2013, September). *The role of positive emotions in positive interventions.* Poster presented at the 13th Congress of the Swiss Society of Psychology (SSP), Zurich, Switzerland.

Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2013, June). *Character strengths and football: Can a nationwide positive event influence character strengths?* Poster presented at the Third World Congress on Positive Psychology, Los Angeles, USA.

Wellenzohn, S., Proyer, R. T., & Ruch, W. (2013, June). *Studying the virtuousness of gelotophobes, gelotophiles and katagelasticists: Self- and peer-rated character strengths in the three dispositions towards ridicule and being laughed at.* Poster presented at the Third World Congress on Positive Psychology, Los Angeles, USA.

Wellenzohn, S., Proyer, R. T., Gander, F., & Ruch, W. (2013, June). *Character strengths and health behaviors.* Poster presented at the Third World Congress on Positive Psychology, Los Angeles, USA.

Wellenzohn, S., Proyer, R. T., Gander, F., & Ruch, W. (2013, May). *Health behaviors as mediators between character strengths and well-being.* Poster presented at the 10th LiMaDoKo of the Department of Psychology at the University of Zurich, Zurich, Switzerland.

Proyer, R. T., Gander, F., Wellenzohn, S., & Ruch, W. (2012, June). *The good character and football: First evidence on the possible impact of a nationwide positive event on character strengths*. Poster presented at the 6th European Conference on Positive Psychology (ECPP), Moscow, Russia.

Wellenzohn, S., Proyer, R.T., Gander, F., & Ruch, W. (2012, June). *Character strengths and life goals*. Poster presented at the 6th European Conference on Positive Psychology (ECPP), Moscow, Russia.

Wellenzohn, S., Proyer, R.T., Gander, F., & Ruch, W. (2012, June). *Underestimating gelotophobes, overestimating gelotophiles, and realistic katagelasticists? Testing self- and peer-rated character strengths in their relation with dispositions towards ridicule and being laughed at.* Poster presented at the 6th European Conference on Positive Psychology (ECPP), Moscow, Russia.

Wellenzohn, S., Proyer, R. T., & Ruch, W. (2012, May). *The relation of self- and peer-rated character strengths and three dispositions towards ridicule and laughter: Virtuousness in gelotophobia, gelotophilia, and katagelasticism* präsentiert am LizentiandInnen-, Masterstudierenden und Doktorierendenkongress (LiMaDoKo) des Psychologischen Instituts der Universität Zürich, Zürich, Schweiz, 31.05.2012.

Gander, F., Proyer, R. T., Wellenzohn, S., & Ruch, W. (2012, May). *Development of scales for the assessment of positive relationship and accomplishment: Measurement issues in Seligman's theory of well-being* präsentiert am LizentiandInnen-, Masterstudierenden und Doktorierendenkongress (LiMaDoKo) des Psychologischen Instituts der Universität Zürich, Zürich, Schweiz, 31.05.2012.

Gander, F., Proyer, R. T., Wellenzohn, S., & Ruch, W. (2012, April). „*What's funny today?" – A humor-based intervention.* Poster presented at the 25th Annual Conference of the Association for Applied and Therapeutic Humor (AATH), Chicago, Illinois, USA.

Wellenzohn, S., Proyer, R. T., & Ruch, W. (2012, April). *The convergence of self- and peer-rated virtuousness in gelotophobes, gelotophiles, and katagelasticists: Relations of strengths of character with dispositions towards ridicule and being laughed at.* Poster presented at the 25th Annual Conference of the Association for Applied and Therapeutic Humor (AATH), Chicago, Illinois, USA.

Wellenzohn, S., Stamm, S., Weber, M., & Ruch, W. (2011, July). *Character strengths and satisfaction with life in youth organizations.* Poster presented at the Second World Congress on Positive Psychology, July 23-26, Philadelphia, USA.

Wellenzohn, S., Gander, F., & Proyer, R. T. (2011, Mai). *Charakterstärken und Lebensziele.* Poster präsentiert am LizentiandInnen-, Masterstudierenden und Doktorierendenkongress (LiMaDoKo) des Psychologischen Instituts der Universität Zürich, Zürich, Schweiz, 26.05.2011.

Stamm, S., Wellenzohn, S., Weber, M., & Ruch, W. (2010, Mai). *Charakterstärken und Jugendverbände: Ein Vergleich der Charakterstärken von Jugendverbandsmitgliedern mit Nicht-Jugendverbandsmitgliedern.* Poster präsentiert auf dem 6. LizentiandInnen- und Doktorierendenkongress (LiDoKo) des Psychologischen Instituts der Universität Zürich, Zürich, Schweiz, 26.05.2010.

Wellenzohn, S., Hofmann, J., M., Weber, M., & Ruch, W. (2009, August). *Birds of a feather flock together- or opposites attract? The role of similarity in character strengths of adolescents in romantic relationships.* Poster presented at the 11th Congress of Swiss Psychological Society, Neuchâtel, Switzerland, 19.08.2009.

Hofmann, J., Wellenzohn, S., Lischer, H., Ture, M., Weber, M., & Ruch, W. (2008, September). *Macht Ähnlichkeit Jugendliche glücklich? Eine Studie zu Charakterstärken in Liebesbeziehungen bei Jugendlichen.* Poster präsentiert auf dem 4. LizentiandInnen- und Doktorierendenkongress (LiDoKo) des Psychologischen Instituts der Universität Zürich, Zürich, Schweiz, 17.09.2008.